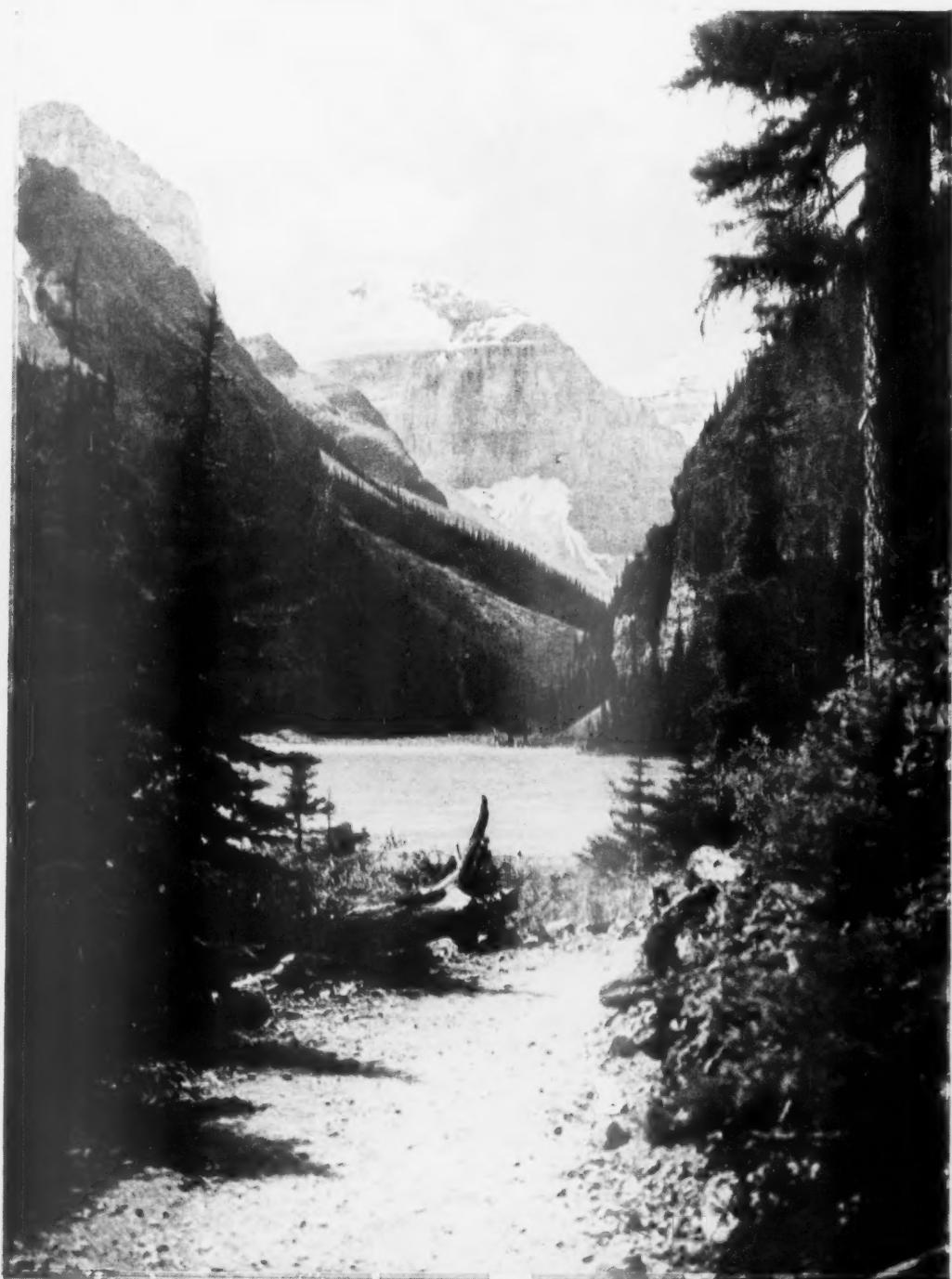


Vol. 24

FEBRUARY, 1918

No. 290

American Forestry



An Illustrated Magazine about Forestry and Kindred Subjects Published Each



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AMERICAN FORESTRY

THE MAGAZINE OF THE AMERICAN FORESTRY ASSOCIATION

PERCIVAL SHELDON RIDSDALE, Editor

FEBRUARY 1918 VOL. 24

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No. 290



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DONATIONS FOR THE RELIEF AND COMFORT OF THE FOREST REGIMENTS

Members of the American Forestry Association and others interested in forestry are asked to contribute to the fund now being raised to provide comforts and any necessary relief to the members of the Forest Regiments called for service in France.

These men, there are some 10,000 of them, have the task of supplying for the army of the Allies such absolute necessities as cordwood for cooking and heating, posts for trenches and mines, planks to haul heavy ordnance over, boards for hospitals and billets; ties for railroads, timber for temporary bridges and many other emergency uses. At least 25,000,000 board feet will be needed monthly. This will be obtained from the French forests, the only source available at present, due to lack of water transportation. These forests the French have generously agreed to sacrifice, but desire them cut, as far as it is possible, along forestry lines.

A joint committee has been formed of the lumbermen and forestry organizations of all kinds throughout the country, which will solicit funds and take charge of all sums raised for the comfort and relief of the men in these regiments. All such funds are to be expended to meet the special needs of the men in this special industry. Immediate needs are along the lines of comfort and recreation essential to physical and moral welfare, and later serious relief for soldiers and dependents will be considered. To meet immediate needs members of the American Forestry Association are asked to contribute generously. Reports of the use made of contributions will be published from time to time in all of the lumber and forestry journals.

The Association asks you to stand behind the men of the Forest Regiments who furnish the lumber which, next to ammunition and food, is the greatest need of the Allied army.

All funds are to be sent to Mr. P. S. Ridsdale, secretary of the American Forestry Association, at 1410 H Street, N. W., Washington, D. C.

FILL OUT AND SEND THIS FORM WITH YOUR CONTRIBUTION

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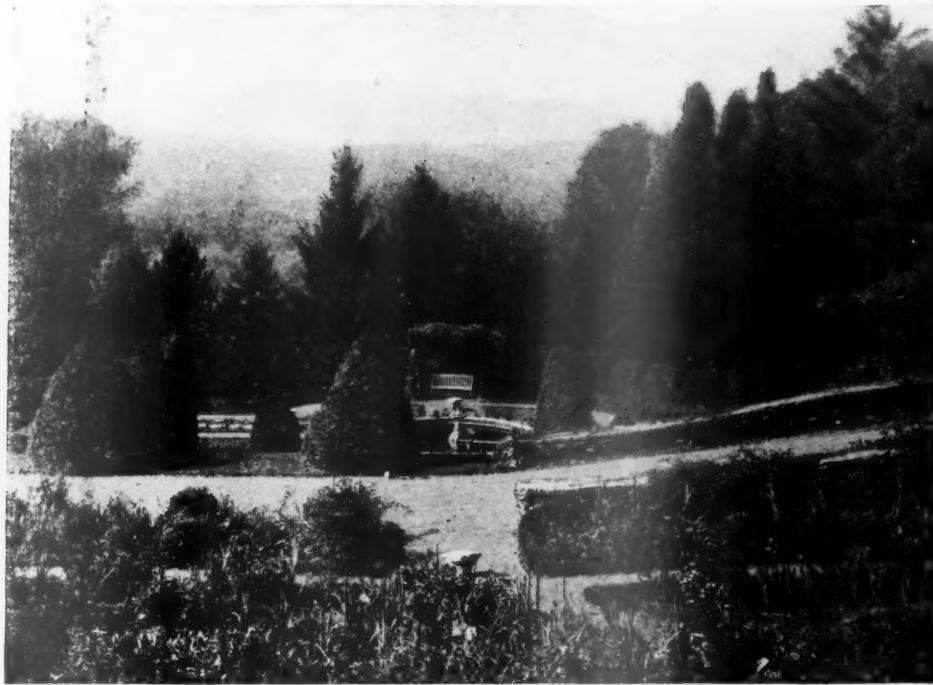
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AMERICAN FORESTRY

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NO. 290

WAR MATERIALS FROM FRENCH FORESTS

FRENCH forests yielding the growth of years for the strengthening of the Allied armies; American foresters working under military control and with the precision and efficiency of a Yankee industrial enterprise; scientific forestry applied to tree cutting with a view to perpetuating the forests of war-stricken France; timbers produced where, when and as needed for the success of the military operations of the armies of France, England and the United States.

In broad terms this is a composite of the impressions brought from the French war zone by Lieutenant-Colonel Henry S. Graves, National Army, who returned early in February to his office in Washington to resume his duties as United States Forester. Blended therewith is the picture of an international war machine working in harmonious efficiency with the armies of the allied nations employing every effort and resource in the world war for the perpetuation of Democratic institutions. In gaining these impressions Colonel Graves has had the exceptional opportunity given only to the man who was early on the ground and who has had an active part in the general scheme of things. His duties have kept him in close touch with foreign operations throughout a broad field; he has seen these activities from the close range of the man in charge of a line of work of great importance in the military enterprise; and his observations have been made through travel afoot and by motor. Thus favored, Colonel Graves has brought back to America a vision of the great war unusually comprehensive and of intense interest. Colonel Graves reached France when the United States had been at war but a few weeks. His arrival in Paris was within ten days

of the arrival of General Pershing. Since that time he has seen the American military program rapidly expand and spread out to its present magnitude. He has seen his own immediate branch of the work grow in proportion to the general expansion. The original plan for forest and lumber work with the American Expeditionary Forces contemplated a single regiment of 1,200 men. These men went forward last summer in the Tenth Engineers (Forest). Commissioned as a major, Forester Graves went across in advance to prepare the way and to map out the work of the American foresters and lumbermen. Early in the autumn he was made a lieutenant colonel.

"When I reached France," said Colonel Graves to AMERICAN FORESTRY, "I found that the program for American military operations was developing on a much larger scale than had been foreseen and that this had developed a greater problem of forestry in connection with supplying the Expeditionary Forces with timber for military needs. The engineering feature of modern warfare is of great importance. The need for materials is tremendous, not merely for trench building and other construction at the front, but for transportation lines, for road building and for the erection of the various buildings required by an army,

to be used as barracks, hospitals, warehouses and for other purposes. The use of wood for fuel is also an item of immense importance.

"The lumber and forest regiments had to be enlarged to meet the expansion of the Expeditionary Forces. For this reason the Twentieth Regiment was organized on a large scale. It was made the largest regiment in the world, because forest conditions necessitate the scatter-



AMERICA'S BEST-KNOWN FORESTER SOLDIER.
Lieutenant-Colonel Henry S. Graves, as he appeared on shipboard after several months of service in charge of Forestry operations in France for the American Expeditionary Forces.

ing of troops over a wide territory and adapting them to the requirements of forest operations. The men are engaged in industrial work rather than in military activity and on this account they do not require the same measure of military supervision which goes with ordinary military work.

"My first work was to look the ground over thoroughly and make recommendations as to the forces and

of that to which they are assigned. It has proved possible to take the military organization and adapt it very effectively to the industrial undertaking in which these men are engaged and the men are working effectively. The health of the regiments is exceedingly good. In some cases there was slight illness on reaching France, due to the sea voyage, the necessity for keeping everything clamped down through the submarine zone and the rainy weather encountered in France; but the men soon came out of this in splendid shape and we are all very proud of their condition. They are in good camps and their spirits are high and their enthusiasm unbounded.

"The timber to be cut in our work is marked for our men by French foresters and the cutting is being done on forestry principles, to bring about the best possible results in silviculture. The reports brought to me through French officials were extremely gratifying, as showing that they were much pleased with the results of the work done by the American regiments."

For all those connected with the Forest regiments Colonel Graves voiced appreciation of the work being done by the Welfare Committee for Lumbermen and Foresters



A MONARCH OF THE FRENCH WOODS

This picture, brought across by Lieutenant-Colonel Graves, gives an idea of the size to which the silver fir grows in France. This type of tree attains a diameter of two to three feet and frequently grows to a height of 125 feet or more. This one is of exceptional size and of course will not be cut even for military use.

equipment which would be needed to keep pace with military development and to prepare for the reception of the forces. Soon after my arrival I was placed in charge of the section of forestry in the engineer corps. The first problem, of course, was to secure the forests in which the work was to be done. I furnished a general idea of what we needed in this respect and a line of procedure was worked out with the French authorities as to the cession of private forests and the granting of cutting rights on those publicly owned. This was done in co-ordination with the allied armies and I found splendid co-operation at the hands of the French authorities and others concerned.

"When the Tenth Regiment reached France its men were placed immediately and sent to their respective locations, where the sawmills were to be placed and where they will stay for some time. The same thing was done with the early arrivals of the Twentieth. These sawmill units are necessarily somewhat scattered and the military organization has been worked out and adapted to the need for specialized men for work of the character



A STAND OF SILVER FIR IN FRANCE

This is one type of forest in which the American Forest and Lumber Regiments are at work. The quality of the silver fir is more like our *abies amabilis* or Pacific Coast white fir than any other American tree. It grows in the mountains of Eastern France. The two trees in the center were trimmed to promote the growth of the younger trees.

in War Service and other agencies interested in the welfare of the men. "In France," said Colonel Graves, "the feeling is that of the keenest appreciation, not merely for the sentiment behind the work, but for the exceedingly useful materials provided for the health and comfort of

the men. The arrival of the shipments is looked forward to with great eagerness and if the contributors could see the men as they leave the place of distribution with their packages under their arms they would feel fully rewarded.

"The most useful articles, of course, are in the form of wearing apparel, such as sweaters, socks, helmets, mittens and the knitted wristlets. A man who is driving in the cold finds the wristlets as useful as anything he could have, as they furnish protection that prevents much suffering with cold hands. Tobacco, too, is deeply appreciated. At times it is extremely difficult for the men to buy tobacco in the neighboring stores and in addition to this they naturally prefer the American tobacco to which they have been accustomed. The work is highly important and everybody who has been helpful in it has earned real gratitude from the men who receive the benefits."

Colonel Graves has returned to

and resulted in his return as soon as the authorities on the other side felt that he could be spared. Major William B. Greeley, on leave from his duties as Assistant United States Forester, has taken Colonel Graves' place in charge of the technical forestry work in France. Colonel J. A. Woodruff is in military command of the Forestry troops.

At the camp of the Twentieth Engineers (Forest) at American University, in the District of Columbia, rapid progress is being made in the organization and equipment of additional battalions for the regiment. The first, second, third and fourth battalions have been in France for some time. The fifth and sixth battalions were completed in January and Colonel W. A. Mitchell and his staff are busily engaged in organizing the seventh and eighth. Work was also under way on the forty-first battalion of



LUMBERING FOR THE ARMY

This group of pictures gives an idea of the surroundings and operations of the Tenth and Twentieth Engineers (Forest) sent to France by the United States War Department. The men pictured tell eloquently of the health and spirits of the workers in the war zone.



the Forest Service at the request of the Secretary of Agriculture. In going to France the Forester's original plan was to be there no longer than was necessary to establish the work of the American forest and lumber forces, to work out the procedure for acquiring forests and to build up the organization necessary to carrying on the work. This has all been accomplished and Secretary Houston was anxious to have Forester Graves resume his work at the head of the Forest Service. Interchange of cablegrams took place

road and bridge builders. The various units will continue to go across to the French forests as rapidly as possible.

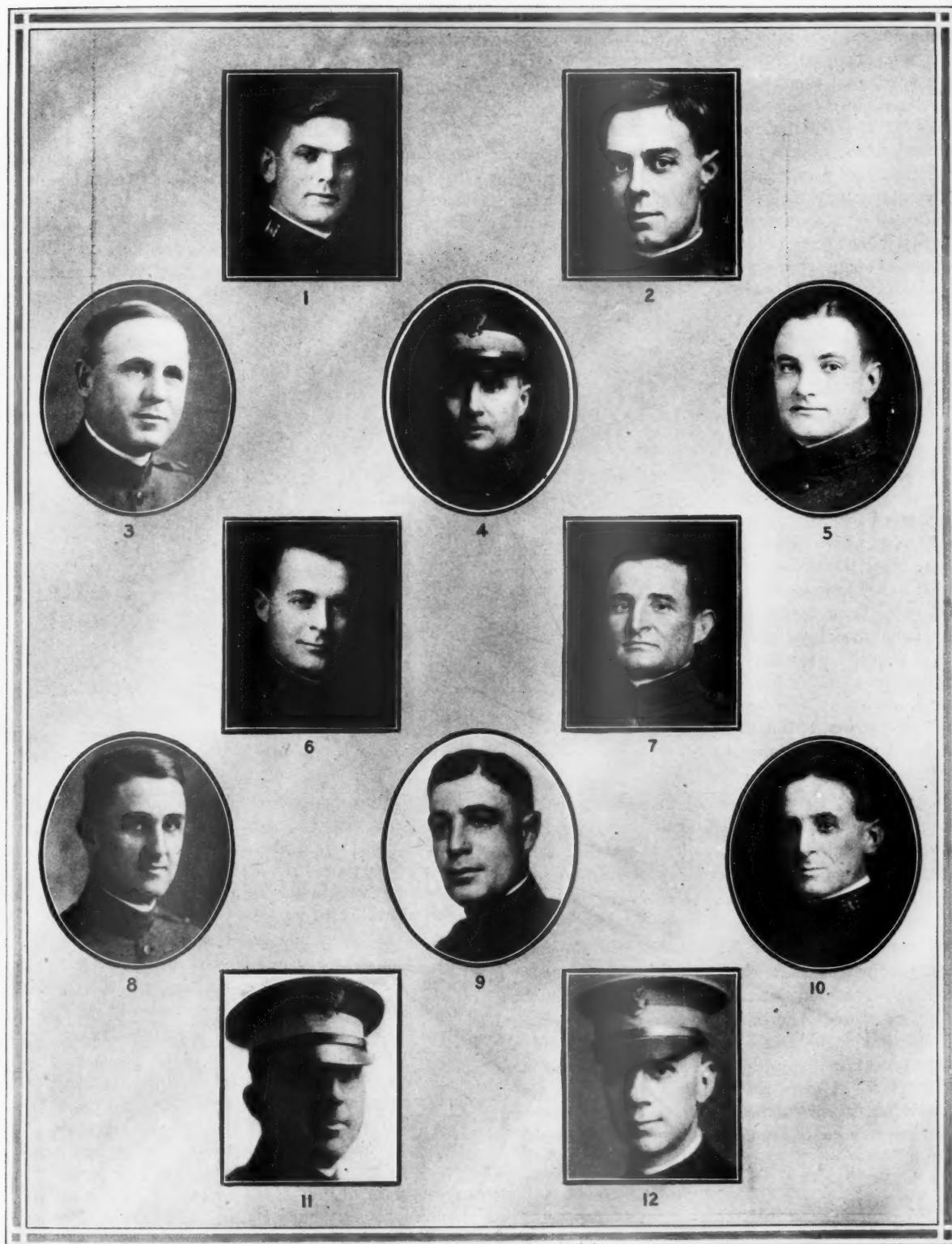
Letters from the war zone tell of some of the experiences and impressions of American foresters in the war zone. One of the most recent letters was from Captain R. C. Hall, of the United States Forest Service, now assigned to timber reconnaissance in France with the American Expeditionary Forces. Captain Hall writes: "I had the good fortune to see the Tenth Engineers



Photographs by Harris & Ewing.

AMERICAN FORESTRY'S PORTRAIT GALLERY OF OFFICERS OF THE TWENTIETH ENGINEERS (FOREST)

1. 1st Lt. W. G. Conklin. 2. Capt. Frederick C. Moore. 3. 1st Lt. Frank Mizell. 4. 1st Lt. R. H. Rowdybush. 5. 2nd Lt. Luther B. McDaniel. 6. Capt. F. R. Weisel. 7. 1st Lt. J. H. Price. 8. 1st Lt. Alfred D. Kettenbach. 9. 2nd Lt. Charles J. Davis. 10. Major George H. Kelly. 11. 1st Lt. Cornelius W. Smith, Chaplain. 12. Major William C. Moore.



Photographs by Harris & Ewing.

AMERICAN FORESTRY'S PORTRAIT GALLERY OF OFFICERS OF THE TWENTIETH ENGINEERS (FOREST)

1. 1st. Lt. Paul D. Mackie. 2. 1st Lt. Lester W. Jacobs. 3. Major Collin E. Clark. 4. Capt. F. R. Barnes. 5. 1st. Lt. Ralph H. Faulkner. 6. Capt. George G. Steel. 7. 1st. Lt. Milton Pittman. 8. 2nd. Lt. Harry G. Miller. 9. 1st. Lt. Frederick B. Judge. 10. 1st. Lt. Gilbert C. Eastman. 11. 2nd. Lt. Fred A. Roemer. 12. 2nd. Lt. Julius A. Herbott.

(Forest) before they split up, as I had to conduct one of the officers to a forest I had examined. They seem to be a fine body of men.

"Sometimes I think the French are a wonderful people, other times I can't see how they have managed to resist the methodical Germans at all. They are extraordinary in the way they save and make use of material resources, but very wasteful on the whole of human effort. Of course, their practical geniuses must be largely at work near the front, and before the war evidently labor did not count for much. They are practically all excellent cooks, and there seems to be plenty of meat of good quality for all except perhaps the extremely poor. In this respect, however, conditions may be worse in the later years of the war.

"So far, our long fight with the Boche 'subs' the last day of the trip across is the only active warfare I have seen. Have had occasion to see some practice work with hand grenades, etc., from model trenches at a French training school. On my next work, however, I should at least see some air-fighting, but don't suppose I will get in range of shells and gas.

"I am getting along fairly well with the language, although I can not follow an ordinary rapid-fire French conversation. When they slow down a little I can get about everything now, and can express my own ideas with much bad grammar. Can now order baked apples without being afraid they will bring me fried potatoes. I manage fairly well on the French "petit dejeuner," usually taking chocolate which is nearly always good, but wouldn't want to do much mountain climbing without something more. The other meals are very hearty. I am falling in with most French customs, but draw the line at breakfast in my bedroom when there is any other decent place. I also occasionally insist on a glass of plain water, much to the astonishment of all present. Have never seen a Frenchman drink water except in mixture.

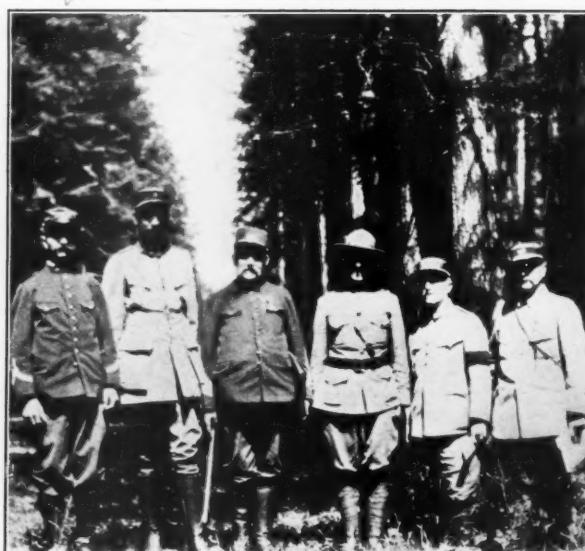
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"Am now chasing around in the Army Zone with auto and chauffeur provided—wouldn't be such a bad job but for the cold and difficulty of getting meals in the small towns just back of the front. Got pretty close on my last trip—could hear cannonading all the time and saw much airplane activity. The Boche dropped a few bombs the other night on a town near where I was staying. I went by there the next day and saw the damages

—several houses smashed to splinters and a big hole back of a cafe. Met a medical officer hunting a new billet—luckily he had been out of his room when it got smashed up."

* * * * *

Frank S. McNally, of the selling staff of the A. Sherman Lumber Company, chronicles some of the doings of the Tenth. The regiment arrived in Scotland early in October after an uneventful trip of approximately three weeks on the Atlantic. Arriving there they moved immediately across country to an English Channel port, where they remained at rest camp for several days before making the channel trip. From the French port a rail journey of two nights and a day brought the regiment to its station, where after a couple of weeks, the regiment spread over the country. Mr. McNally's detachment, the first, under Lieutenant E. L. Lindsey, immediately set to work laying out a side track for the mill, and at the time the letter was written woods operating had been going on for some time, while getting out poles was the principal item of interest pending the arrival of the mill.



FORESTER SOLDIERS OF TWO FLAGS

Forester Graves, in his United States uniform, is here shown with three French officers at one side and two at the other. The picture was taken in one of the Forests where lumber operations are being conducted by the American regiments.

The boys are quartered under canvas with a few old buildings for headquarters. In a barn nearby a clubhouse has been set up where the boys manage to knock out a pretty good time. Mr. McNally likens the operations in France to those in the Adirondacks. They are cutting practically all softwoods, Scotch pine and Norway spruce mostly, the latter, he says, being similar to our shortleaf. The boys are all in good health, well fed and on the job from sunrise to sunset. Mr. McNally pays his respects to the officers and men in the regiment who, he says are fine soldiers, first-class lumbermen and naturally good fellows.

Another recent letter is from Herman Work, formerly deputy Forest supervisor on the Caribou Forest, and now with the Tenth Engineers in France. He writes: "I wish you could see our layout. It's the best camp I ever saw. After the war I hope to be able to describe it to you, with diagrams, but of course that would never do now—some friendly Boche might intercept the letter. The timber is better than anything I know of in District 4 from a logging standpoint. I doubt if the darkness of these forests has been bettered very much anywhere. Big trees and very dense stands—walk a hundred yards into the woods and you are in all over without much chance of seeing out, for they have planted younger shrubs all along the edges.

"My particular job is putting out the raw material and it would be a lot too much for me if I didn't have a fine lot of men with all kinds of experience and who know the game. As it is, we are putting out the stuff. Dunbar, by the way, is making very good as a sergeant, handling the general office business and discipline. Miller Benedict is summary court officer for Company D and I have the same job for Company F. Wish you could drop in to look us over. You would enjoy showing us how to save time and effort and we would give you plenty of bully beef and beans, together with about everything else needed. Great lot of officers and men in this outfit."

According to a letter from Captain E. W. Kelley, Company F, Tenth Engineers, his Company had the honor of manufacturing the first board made by American troops in France. A section of the board is on its way to the San Francisco office to be preserved as a relic.

Floyd A. Colby, of the Sierra National Forest, writes: "The French have a novel system of logging,—at least it is new to me. First, they go out into the woods, pick out the trees they want to fell, then one man climbs to the top and trims off the limbs. They do this to avoid knocking down the smaller trees, or of even breaking the limbs off. When they get ready to fell the trees, they side-notch it, no matter how small it is. That is something I cannot account for in small timber. They use oak wedges, about two or three, and a common timber saw about five or six feet long, and it has no drags on it. The teeth are just like those of a hand-saw. When they get the tree down they peel it to full length, that is, to where the tree is about three inches in diameter. They do not saw it into cuts in the woods, but haul it full length.

"The trucks are what I would call a common four-horse wagon, only they are a narrower gauge than our narrow gauge wagons. They use about two oxen to a truck and it takes about half a day for them to load, which is done with a logging jack of the ratchet variety. They come in with those trees full length—about 150 feet long, and have two or more on the wagon. One is loaded on the bunk and one under the axle. They uncouple their wagons and set the wheels 80 to 100 feet apart, and when they come to a turn they unfasten the

reach of the rear truck and steer with it around the corner. The brake is on the front wheels and is made on a crank with threads on the straight part of it. So, to put on the brake, the driver grabs the crank and starts winding. The oxen have their yokes (I guess that is what they call them) fastened to their horns. The yoke is only a little light piece of wood and is nearly straight, and there is a pad just behind the horns for the yoke to

rest on. There is a hole in the front of the yoke through which they poke the wagon tongue. A wooden pin holds it in place. When they want to back up, they turn the team around and put the tongue in the other way, so they push on the end of it. Of course methods here are all new to us, and we are getting new ideas every day. We lose a lot of things we never dreamed of, but I suppose the French would be just as surprised at some of our customs.

"The French forests are all clean—no windfalls and no burnt butts on the trees. The trees are tall, straight and round, and hold their size pretty well. They are thick and often in rows.

"It would make you laugh to hear some of the arguments that are pulled off here. There is some kind of an argument going on all the time. The sub-

jects are of all kinds—on all phases of life, labor, war, religion, and I might include the Bible. We had a discussion of saw-handles the other day. All the men from the Middle West and Eastern States claimed a straight handle was the best for all work—bucking and felling. They said it was better than our standard handle, especially for felling—'the handle set on the top of the saw,' they said. You can imagine what a man used to our saws would say if you gave him one of those. There isn't a thing to prevent you from getting your fingers pinched, especially in sawing large trees. For my part, I wouldn't use one of those for any purpose. They claimed they threw our kind of handles on the scrap heap years ago.

"The weather here has been bad for a few days,—rain and snow and quite cold. Of course the temperature is not so low, but it is that damp, disagreeable kind of cold—cloudy and foggy nearly all the time. I judge from the 'water moss' on the trees and on the ground all through the woods that it rains almost incessantly here. This moss never grows in a dry climate.



FORESTER GRAVES IN FRENCH FOREST

The United States Forester is here shown in one of the pieces of woodland in which the American Forest Regiments are employed. The tree by which he stands is a maritime pine, the turpentine pine of France. It is not quite as large as our yellow pine, but produces some exceedingly good timber.

"I would like to be at home for Thanksgiving or Christmas but there is absolutely no chance, as I couldn't make it if I started tonight, which I am not going to do. I hope to be home by the Fourth of July, but there is no telling. The Bible says, in the thirteenth chapter of Revelations, "The world's war would extend through a period of 42 months," and that time is up next February—but there's no telling whether that will come true or not.

"We get the Paris edition of the New York *Herald*, and there is not much of interest in it to us—all the papers from the States are so old when we get them that the news seems stale. I get the National Bulletin, though it takes a month for it to come, and is quite irregular. The last one I got was printed October 4, so you see it is quite old. I am so glad I have my kodak with me, as I can make up quite a collection of pictures to bring home with me. We can buy films at our Canteen. The Canteen is our general merchandise store. I never heard of a store called a canteen until I joined the army. The English and French have the same name for it. They gave us some magazines today that were anywhere from one month to four months old, but good reading after all."

C. W. H. Douglass, formerly with AMERICAN FORESTRY, is now a member of the Aviation Corps of the American Forces. From England he writes: "Many things have happened to me since leaving Mineola, the main one being that I'm here in England instead of Italy as I expected. It seems that the English Government agreed to train a



MAJOR B. F. WADE

In command of a headquarters detachment of the Twentieth Engineers (Forest) Regiment, and the last soldier to leave the sinking *Tuscania*, torpedoed on February 5, near the Irish Coast.

THE tragedy of war was brought closely home to the members of the American Forestry Association by the sinking of the American transport *Tuscania* early in February. Among the military passengers on board the torpedoed ship were Companies D, E and F of the Sixth Battalion, Twentieth Engineers (Forest), numbering about 800 officers and men and a headquarters detachment of the regiment under command of Major Benjamin F. Wade. Major Wade is one of those known to have been saved. The Twentieth is a regiment of lumbermen and foresters and is known as the largest regiment in the world. It has been in process of organization for several months at American University Camp in the District of Columbia. Detachments have been sent across from time to time, as fast as organized and equipped. It is for the benefit of the men of the Twentieth and those of the Tenth Engineers (Forest) that the Lumber and Forest Regiments' Relief Fund has been established at the headquarters of the American Forestry Association.

certain number and we just happened to arrive at the strategic moment. Later detachments went to Italy. The climate here is hardly likable—damp, cold with fog, etc.—but aside from a cold or two and a touch of influenza, I've been feeling fine; am getting round and fat, and most of the other boys the same.

"To get back to chronological order. We spent six weeks (about) in an English ground school, repeating the work we had done at home, and then after a fortnight in machine gunnery schools we were scattered in small groups among the flying schools all over England.

"I've completed my preliminary training on a staid and dignified old bus that we used to call an "animated lawn mower" and am now at an advanced school for work in the faster machines. Expect to fly scouts, the wasp-like machines that run around about 130 miles per hour. Great sport we all agree. We work into those through easier flying types, meanwhile learning to loop, roll, spin, Immelmann, stall, etc. It's the most interesting sport that ever was invented, I believe. When one is up a few thousand feet the sense of dizziness experienced when looking down from a high building is absent—everything is peaceful and quiet. Rows of tidy houses with red tile roofs and a batch of chimney pots, from

which wisps of smoke curl about and disappear, make the towns and fields look like squares on a checker board. It's really very pretty. In bumpy weather you don't have much attention to waste on the landscape though."

AN instance of speeding up on war contracts is shown recently by the shipment of five 30-foot Oregon timbers from Eugene, Oregon, to Redding, California, by express. The timbers were so long that the loading and unloading had to be done through the end door of the car.

TOUTING THE TOURIST

BY MARK DANIELS

FORMER SUPERINTENDENT AND LANDSCAPE ENGINEER OF UNITED STATES NATIONAL PARKS

NOT so long ago that the incident cannot be remembered by Mr. Brandt, the manager of El Tovar, an effete easterner was lured for the first time from his fireside in Brooklyn to the Grand Canyon, way west of the Appalachian Mountains. Having read up thoroughly on the subject of accoutrement and attire he selected an outfit well calculated to render him quite inconspicuous in a western setting and succeeded in manfully repressing a growing desire to don the picturesque habiliments until within an hour's ride from the canyon. There he arose and, in the stillness of the early morning completed his toilet in the otherwise unoccupied dressing room. As the train came to a stop he stepped from the platform arrayed in full panoply of the western cowboy as set forth in the illustrated catalogue. Around his neck was the omnipresent bandana. On his head was a sweeping sombrero with lines that would have thrilled Gainsborough, and in the tops of black leather boots that reached nearly to the knees, he had carefully tucked his

spotless khaki trousers. The blue flannel shirt scratched his neck and a pistol pressed painfully against his appendix, but in spite of these he stalked proudly to the hotel.

The scene that confronted him as he stepped into the lobby occasioned an acute attack of eczema that could not be entirely attributed to the flannel shirt, for lounging languidly in some of the chairs were women immaculately dressed as if ready for a morning stroll in Central Park. Here and there were men in tennis flannels with spotless white shoes. A few were dressed in the ordinary street attire of the New York business man.

The pseudo cowboy registered with a trembling hand as he recalled that all his clothes, with the exception of what was on his back, were in trunks on the way to Los Angeles. His efforts to shrink to a size that would permit hiding behind the cuspidor brought beads of perspiration that fell upon the bandana, disclosing the fact that its colors were in full sympathy with his inclination to run. Having been assigned his room by a clerk whose



THE PAINTED CLIFFS, APACHE TRAIL

The broken and multicolored canyons of Apache Land are not to be duplicated anywhere else in the world. In the spring the colors of the stone cliffs are put to shame by the orchid-like blossoms of cacti which bloom in great profusion.

lower lip was firmly clenched between his teeth, he drifted silently but swiftly to his room and was seen no more.

It is recorded that during the entire day a lone figure could be seen sitting by a window that commanded a view of a bit of the canyon from the second floor. Little more than the head was visible, but now and then enough of the torso would appear to suggest the thought that the figure was attired in pajamas despite the fact that the heat was not intense. As the train pulled out that evening a man wrapped in a long overcoat, with the collar turned high swung aboard, exhibiting a pair of new black leather boots as he did so. Passengers wondered at the heavy coat in Arizona. "Probably from Guatemala," remarked one, and the incident was forgotten in the mad scramble to begin the recounting of narrow escapes on the Bright Angel Trail.

Nearly every locality in the scenic areas of the west that is much frequented by tourists has similar stories to tell of some hapless traveler who was the victim of that curious admixture of well meaning exaggeration and misstatement so commonly encountered in the perusal of the railroad and tourist bureau descriptive folders. Frequently tourists will arrive in a national park with half dozen trunks containing evening gowns, high-heeled shoes and what not, firm in the belief that the hotel folder showing beautifully vignetted half-tones of a throng of lovely women in decollete and men in evening dress presents a picture of the regular nightly scenes in their spacious drawing rooms. It is not at all uncommon to find guests in Yosemite spending nearly all their time on the veranda or in the hotel like the tourist at Grand Canyon,

because they brought no walking shoes; and by the same token some may be found in tennis flannels huddled over stoves at altitudes where the cold weather comes on early. If the truth were known, in all likelihood it would be found that those tourists who have taken the scenery folder too seriously are now knocking everything west of the Alleghenies, from the broad Pacific to desert sunsets, with an effectiveness that offsets the value of many thousands of folders. Therefore, it would seem to be the part of wisdom to put a curb and snaffle on the prancing literary Pegasus who writes the bulletin, or at least confine his flights to the realms of scenery. If he wishes to show his prowess he may tackle the ruins of the southwest or the Grand Canyon and hang festoons of superlatives on every cliff without overdoing it. The Grand Canyon, of course, offers the best opportunity for reckless writing, and sooner or later everyone who has a leaning toward descriptive writing tackles it.

If descriptive literature, as it is called, seems to possess a certain carefree disregard for the written superlative in describing the

Grand Canyon, it is as conservative as the estimate of a pawnbroker when compared with the utterances of the tourist who beholds the "Titan of Chasms" for the first time. Stupendous, marvelous, tremendous, just lovely, exquisite and even cute are applied to it daily from the rim until the river has sunk to a depth of nearly a mile in its efforts to get out of earshot.

A gentleman whose long years of residence in Boston justified him, in his own mind, in attempting to describe succinctly the wonders of the sight, one day was exercis-



A GLIMPSE OF THE SURPASSING BEAUTY OF CRATER LAKE

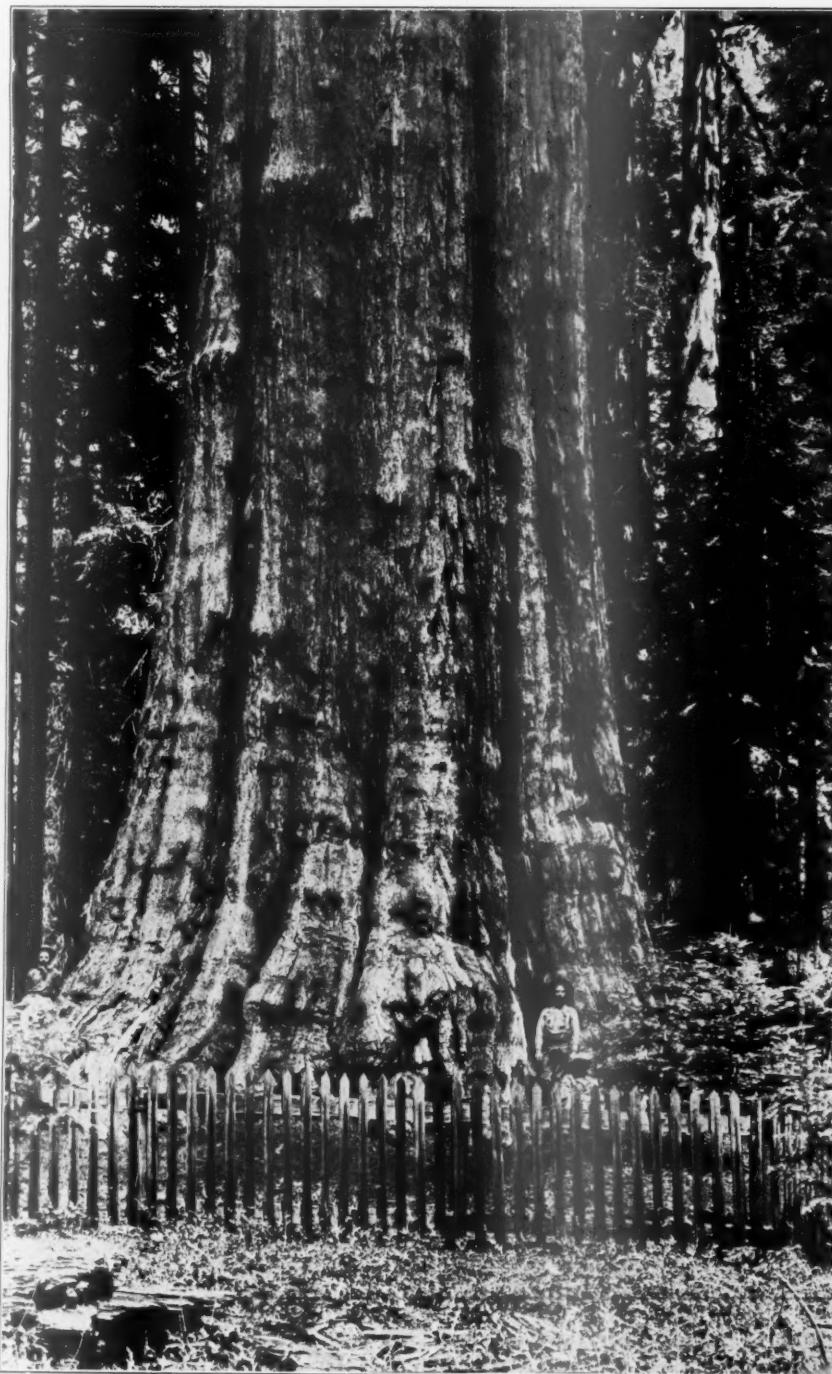
Pale jade greens and deep purples? Yes, we have them. This way, please. You will find them on the summer counter. Forward, Crater Lake.

ing his vocabulary without leash up and down the terrace of the rim. Near him, with elbows on the wall was a gentleman evidently from the west, for he was silently chewing tobacco and punctuating his line of thought by occasionally spitting with care at some imaginary object apparently suspended in midair before him. It has been said that a gentleman never spits; he expectorates. This may be true in some localities, but "way out west" a gentleman never expectorates; he spits, frequently with astonishing accuracy. (Some one has said that a westerner's idea of heaven is a long row of cuspidors and a pocket full of chewing tobacco). In his excitement the Bostonian did not notice that his neighbor was chewing tobacco, so he addressed him. "See the sun glint on that peak. It might have been the throne of Zeus from whence he hurled the thunder bolts that marked with riven stones the power of his might. Sir, have you ever beheld such a staggering spectacle?" The westerner paused in his steady chewing, turned just enough to look into the speaker's eyes and said nothing. "Are you not overwhelmed by the vastness of this yawning chasm? Are you not moved at all?" asked the easterner. The westerner eyed

him keenly for a moment, turned his head slowly back and, resuming his contemplation of the opposite rim, spat carefully at some invisible target. "It sure do stranger," he said at length. "This is the first place I've been to where I could spit a mile."

Fortunately for the advertisement writer, it is difficult to overstate things in describing scenery in the southwest. The great canyons in the vicinity of Roosevelt Dam, ruins

of the cliff-dwellers and the astonishing colors by day and night defy exaggeration by either written or oral expression. The marvel is that any one should essay the task in seriousness. As Senator Phelan said of California, "It is impossible to tell the truth about it without lying about it." However, such is not the case in describing service and accommodations that are to be had. It is difficult to "See America First" if the glare of white granite in Yosemite or snow in Glacier Park has blinded your eyes because you were not told to bring colored glasses, to say nothing of the tears that will fill the eyes of him who is not accustomed to the erratic oscillations of a Mexican saddle. But the real complaint against those who are interested in developing travel at home is not based so much



THE STUPENDOUS PROPORTIONS OF "GENERAL SHERMAN" ALLOW OF NO EXAGGERATION

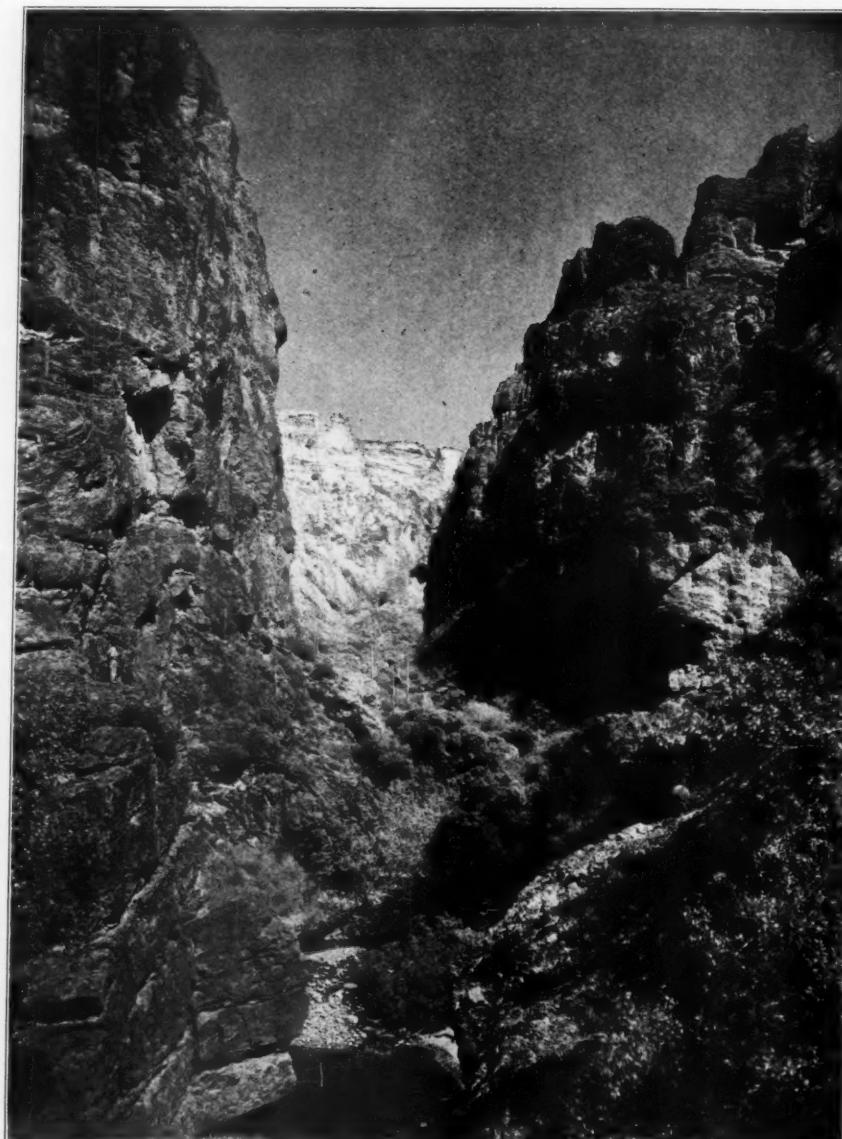
It may have been the story of the Sequoia Gigantea which first gave Californians the reputation of possessing a strong inclination to exaggeration, but perhaps this picture of the greatest tree on earth—"General Sherman"—may go far to remove the stigma of such reputation.

upon exaggerations as upon misleading statements as to how and with what degree of comfort the trips may be made, with what equipment and preparation the tourist should fortify himself.

There is a hotel located on a shoulder of a canyon side near one of the National Parks in the west. The canyon is very deep and its walls surround the hotel on every side. A railroad bulletin describing the hotel says that it is "situated on a high, wooded plateau, giving a beautiful view in every direction." Of course, it is possible to see in every direction but not so far that any little defects in the lands cape will escape the naked eye. As a result of such statements many made reservations at this particular hotel and were so disappointed that they never went into the Park, where is to be found some of the most magnificent scenery in the United States. Even the federal government has acquired the habit, for in one National Park bulletin we read that "An excellent road will carry the visitor — to several comfortable hotels and camps." As a matter of fact, when this bulletin was written there was but one hotel in the Park that could lay claim to any degree of comfort, while the proximity of garbage heaps precluded the possibility of comfort on the part of anyone who was not enjoying a cold in the head or was otherwise immune to the olfactory assaults of the camp neighborhood. Thanks to the energy of a new parks administration, this condition has been remedied but at

the time of publication the bulletin was strangely misleading, not only as to the conditions but as to the extent of accommodations.

That these various statements of a more or less misleading nature are not wilfully made with the intention to deceive there can be no doubt. They are the product of a deep affection for the wonderful scenery and a lack of knowledge of just what the tourist should and wants to know. No sympathetic understanding of the scenery seeker's mental process would ever suggest describing a trip across the great desert, even in double sealed Pullman cars, as being "free from dust," as one folder puts it. There is no way of crossing the desert without a little brush with the dust, and it is not fair to give the tourist the impression that he may expect to do so and emerge with immaculate linen or that his wife can wear her velvet gown with impunity. Not that the trip should be disparaged, for the desert is one of the most fascinating sights in the transcontinental journey, but the tourist wants to



ANOTHER WONDER SPOT ALONG THE APACHE TRAIL

The box canyon of Fish Creek near the Roosevelt dam—perhaps one of the most striking pictures in color and scale that can be found in the United States.

know what he is up against. If he does, in nine cases out of ten he will take any little inconvenience with that rare good humor which is one saving grace of the American people, but if he thinks he has been hoodwinked through misrepresentation he is apt to develop a nasty temper and with it a vocabulary that would turn a sea captain green with envy.

There is a form of exaggeration practiced by railroads



A TOURIST IN A REDWOOD FOREST

This is not one of the half-tame bears such as travelers see in the Yellowstone, but a really, truly wild bear who considers the visitor in his haunts as an invader and is likely to impress this fact upon him if the opportunity occurs. He posed just long enough to have this photograph taken and then departed.

which is particularly vicious in that it affects nearly all of us. It shakes our faith in the "printed word" and emasculates the years of labor which the village school teacher put in endeavoring to teach us what the United States looks like on the map. To illustrate. Suppose you were a resident of New York and that you traveled occasionally —of course such a supposition is an apparent paradox for, as everyone knows, the peregrinations of the New Yorker are confined within the boundaries of Manhattan Island—but just suppose that you did live in New York and now and then you went to Herkimer or Hoboken to get in touch with nature and wild things again. In the course of time your standard of measurement would be the distance from New York to Hoboken or Herkimer as the case might be. If some friend told you he was going to Boston you would unconsciously make a mental note that that was about as far as Herkimer. You might, and probably would, add that it was some journey.

Now, to test your powers of imagination by approximating a *reductio ad absurdum*, picture yourself as tired of the usual pilgrimage and fired with a determination to go far into the unknown west, to Chicago, to Denver, even to Salt Lake City. No longer able to control your burning desire to see our great country you step into a railroad ticket office and emerge with enough maps and literature to while away a month of long winter evenings in happy perusal of the glowing descriptions and brushing up on geography as displayed in the rail-

road folder. Right there you are in for the whole winter.

Soon after dinner you settle down with a good cigar and pick up one of the folders. It happens to be one of a railroad that has a general northerly and southerly direction. You note with satisfaction that the heavy black line passes but a few miles from Herkimer. Fine, now you know where you are and you look to see what relation the distance from New York to Herkimer bears to the distance

from New York to Chicago. Why, there is Chicago about an inch or so to the left of Herkimer. It can't be very far, not over half as far from Herkimer as Herkimer is from New York. Strange, you always thought Chicago was about a thousand miles off. At least you've always known that it was off. Well, get the folder of a road that runs to Chicago. This line runs mostly in an easterly and westerly direction. Hell, here is Chicago way over on the left hand margin of a double page with New York on the right and Herkimer close enough to New York to be a suburb. Hoboken is out of the running. The New England States have been flattened from a



A WELL-KNOWN WONDER OF THE APACHE TRAIL

If you seek other natural phenomena, the Natural Bridge near Roosevelt should satisfy your every want. To add to the wonder of this work, man has planted three acres of alfalfa on the roof of the bridge.

long narrow stretch of territory to a short wide one. If this map is correct you might take in New Orleans on the way to Chicago. So you look up the folder that gives you a line from Chicago south. All is changed again. The United States is now a long country from north to south whose spine is the railroad in question, along and close to the sides of which are New York, San Francisco, Boston and Seattle, all within easy strik-

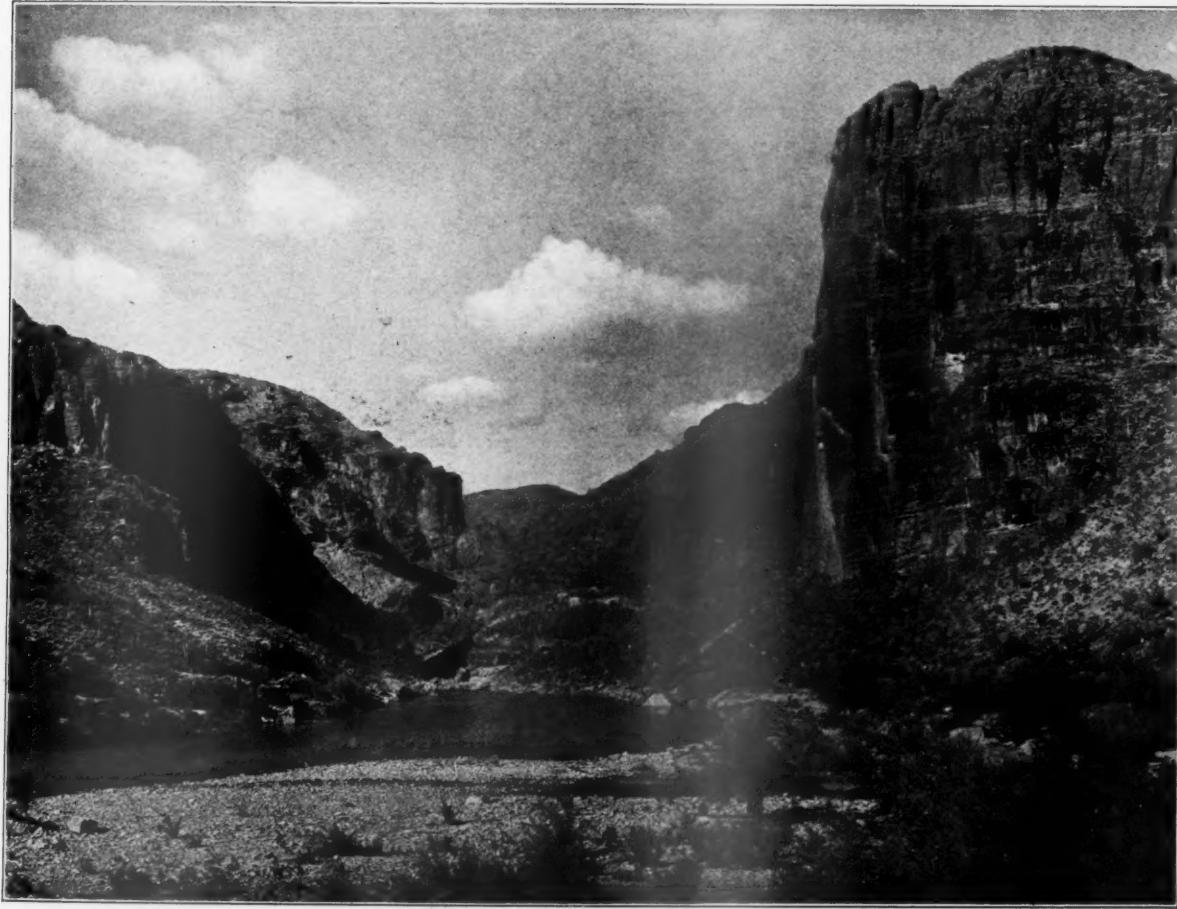
ing distance from the main line. One map shows San Francisco about as far from Chicago as Herkimer is from New York. Another shows it many times farther. And so it goes until in your bewilderment you call your youngest son to ascertain whether the United States is square, round or oblong and whether the Mississippi river flows through Kansas City before it reaches Cincinnati on its way to Galveston.

As an example of the extremes of distortion to which some railroads will go, there is one folder in the late 1916 issue recently in the racks, which shows Chicago as being seven times as far from San Francisco as Los Angeles is. Another shows New Orleans east of a north and south line through Chicago with the distance from New Orleans to Chicago equal to about three-quarters of the distance from New York to Chicago. If the folder you are studying is of a line that runs east and west you will find that the United States is practically served in entirety by this line and that all north and south lines are merely stub feeders. If the line runs north and south the reverse is true.

Why do railroads do this? They will tell you that these folders maps are purely diagrammatic and calculated to show only in a general way the country traversed.

They will not acknowledge that the scheme is devised to tout the tourist into the belief that if it takes the fastest train five hours to carry you from New York to Herkimer the train that can get you to Chicago (which city, according to the map, may be ten times as far away), in twenty hours, is some train. By what authority or right the railroads feel justified in tampering with our geography is not quite clear. That they do is demonstrated. Perhaps it is a case of "You quit punching me in the freight rates or I'll smash you in the geography."

Of course, this method of demonstrating the relative importance and superiority of any particular line is not directed at the tourist alone. The direct appeal is contained in that type of descriptive folder which brought with it the phrase "Railroad Literature." In these the railroads let out the belt and wield the club of metaphor and allegory with Teutonic disregard of consequences. Titan chasms, serrated crests and beetling cliffs are hurled at the reader until he is lost in a cloud of superlatives. Not that there is no scenery that would justify extravagant language for there is much in the west that not only justifies but frequently defies it. It is the indiscriminate use of the adjective that is to be deplored. No doubt the railroad folder is responsible, to a large degree, for



MORMON FLAT, ON THE SALT RIVER

This spot would seem to have been selected by the Indians especially for the purpose of scalping parties. There is an atmosphere about it that makes it just the place for a nice little massacre, and ninety odd Mormons were done away with by the Indians on this site.

fostering the insidious habit of exaggeration, aided and abetted therein by an instinctive predilection of the American people for over-statement. Perhaps it is the knowledge of this national weakness that has prompted the railroads to juggle with our geography, for they mould the country to suit the whim, fancy or conceit of a board of directors as if the land itself, as well as the government that runs it, were clay in the hands of the corporations.

The average American of today reads while running and if, in his mad pursuit of the elusive cartwheel of commerce, he may have occasion to study the map of the United States in a railroad folder, he will, in all likelihood, come to think of the country as being about the shape and proportions shown upon the railroad map. As a result there are important railroads in them. To prove this contention ask several friends how much farther it is from San Francisco to New York than from Chicago to New Orleans, or how far west of New York is the Panama Canal.

There is no occasion to exaggerate the scenery of this country. In fact it is, in most cases, impossible to do so. Nothing but the valor of ignorance would fire a writer to the task of seriously describing the Grand Canyon or Crater Lake, for example. Infinite in its variety, each type is supreme in its class, yet, until the doors of European trav-

el were closed with a bang, as it were, our scenic areas received but a modicum of attention from the traveling public. Since this avenue of escape has been closed to the tourist evidences of his importance as an economic factor spring up on every side, most particularly in the west. Hotel corridors where once the resounding footsteps of a lone guest awakened the sleeping bellboy to a mild surprise now are humming with a throng of tourists. Even in interior towns of California, Oregon and Washington the likelihood of securing a bed in a hotel these days cannot be assured. In Arizona the little lodge at Roosevelt one night recently accommodated fourteen guests with cots in the halls. They laughed about being warned in advance.

Why, therefore, attempt to tout the tourist? In addi-

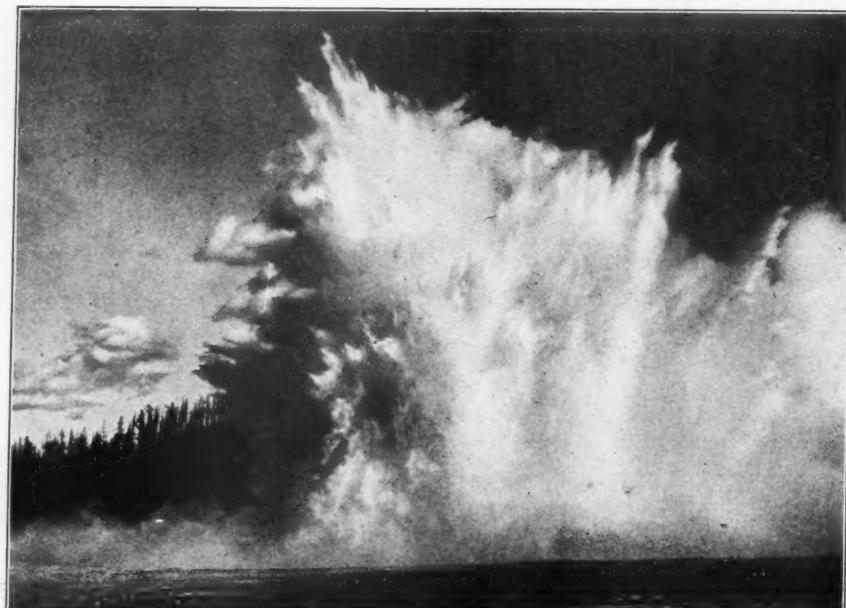
tion to being, in nine cases out of ten, incompetent, irrelevant and immaterial, the literature of those seeking to lure the tourist from beaten paths of travel frequently defeats its own end. A frank statement of conditions of travel, accommodations and what may be seen would result in a steadily increasing travel with few complaints.

To the lovers of antiquity the great southwest offers the ruins of the Toltecs and Aztecs and the ancient villages of the cliff-dwellers, but the summer is no time to see them. In the autumn, winter and spring months a more wonderful land than Arizona would be difficult to find and the cliff dwellings, perched high up in the precipitous walls of a mighty chasm possess the added attraction of a magnificent setting. You do not need to wear high boots nor carry a gun and knife. Just get a comfortable pair of stout old shoes, if you are going to do any walking, and wear some old clothes. Above all, be prepared to forego Welch rarebits, grand operas, taxi-cabs and other luxuries. After a few days you will cease to miss them.

If you prefer forests, lakes and sparkling glaciers, the northwest is your field, but not in the winter. It is not necessary to bring a north pole outfit with bundles of furs and alpine stocks. Just a suit of heavy underwear added to the old suit and shoes and your outfit will be about right.

No matter what you want in scenery, we have it. You do not need to accept a substitute with the statement that "it is just as good." Nothing is just as good as the best and we have the best. Deep blues and pale jade greens are your favorite summer colors. Step this way, please, second isle to the Northwest. Forward, Crater Lake. Romance, Madam? Yes, we carry it, all wool and a yard wide. You will find it in the department of antiquity, southwest wing.

We can offer everything in season: lurid desert sunsets in winter; ruins of a forgotten race flooded with the light of an autumn moon; sparkling, thundering waterfalls that waft their sprays to acres of spring blooms and towering glaciers that glitter in the summer sun. But like all fruits of Nature they must be taken in season.



YELLOWSTONE EXCELSIOR GEYSER

Nothing is as good as the best and we have the best. In Yellowstone we explode a crater every day for the benefit of the tourist and here is one of our finest in action.

WOOD FUEL AS A NATIONAL NEED

OUT OF the present coal situation has come no one thing more important than the lesson for next winter. Forced suspension of trade and industry on heatless Mondays and wide-spread suffering and hardships throughout the severe winter have emphasized the need of fuel preparedness for the cold season of 1918-1919. Forehandness has become imperative. Reduction of the strain on coal production and coal transportation are foreseen as a national obligation. For provision for the future, as well as for relief for the present, the use of wood for fuel has become what George Ade might possibly call a burning issue.

Concrete expression of this vital point is given in a statement issued to the county fuel administrators of New York State by Albert H. Wiggin, state fuel administrator. In this statement Mr. Wiggin forecasts that coal will be refused next winter to all persons who have access to supplies of wood. He expresses the belief that individuals, and even communities, who have access to wood supplies, and do not take steps to cut the wood and make it available, will find themselves in the pinch of the fuel shortage more seriously when cold weather again comes around than they have been this year. His letter is intended as a forewarning of these conditions.

"Every indication points to the fact that the coal stringency will be even more

acute next winter than it is at present," says the Fuel Administrator in his letter. "This accordingly makes it absolutely necessary that the production of wood for fuel purposes, to meet next winter's shortage, be started immediately, upon the largest possible scale and with the utmost energy. It is probable that the Fuel Administration will be obliged to restrict the available coal supply to necessary war industries and to persons so located that they are unable to secure wood. In fact, it has already been necessary to take such drastic action in some localities.

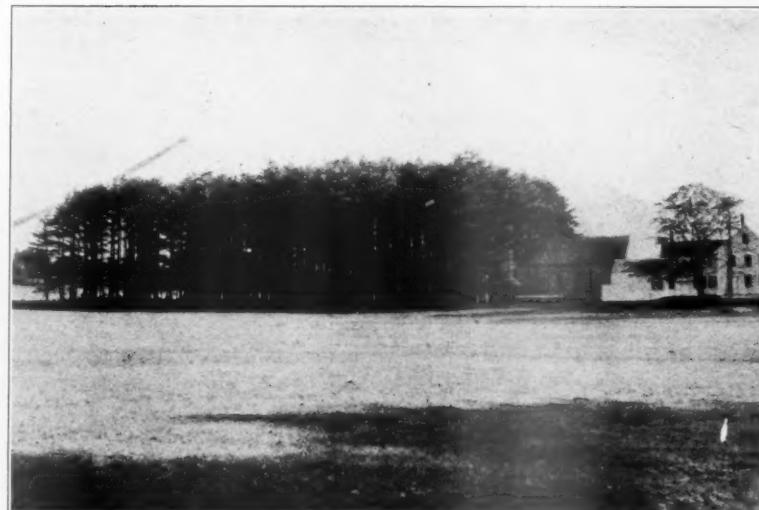
"It is the duty of the local fuel administrator, inasmuch as this danger is now foreseen, to have the need thoroughly

understood in all rural sections and having access to wood supplies, in order that they may at once institute effective measures to insure their supply of wood fuel for next winter, and thus protect themselves."

Persons who plan to relieve the coal shortage by burning wood can figure, roughly speaking, that two pounds of seasoned wood have a fuel value equal to one pound

of coal, according to experts of the Forest Service. While different kinds of wood have different fuel values, the foresters say that in general the greater the dry weight of a non-resinous wood, the more heat it will give out when burned.

For such species as hickory, oak, beech,



THE WOODLOT A SOURCE OF FUEL

Such growth as this will help solve the nation's fuel problem. By judicious cutting the woodlot is improved, future usefulness is not impaired, and the country is given needed help to win the war to make the world safe for Democracy.



THE PARTNER OF THE WOODLOT

This is a busy sawmill engaged in the useful occupation of converting woodlot timber into fuel. Portable sawing machines can serve an entire community in a short time and at very slight cost. In this partnership lies the solution of a grave national problem.

birch, hard maple, ash, locust, longleaf pine or cherry, which have comparatively high fuel values, one cord, weighing about 4,000 pounds, is required to equal one ton of coal.

It takes a cord and a half of shortleaf pine, hemlock, red gum, Douglas fir, sycamore, or soft maple, which weigh about 3,000 pounds a cord, to equal a ton of coal, while for cedar, redwood, poplar, catalpa, Norway pine, cypress, basswood, spruce and white pine, two cords, weighing about 2,000 pounds each, are required.

Weight for weight, however, there is very little difference between various species. Resin affords about twice as much heat as wood, so that resinous woods have a greater heat value per pound than non-resinous woods, and this increased value varies, of course, with the resin content.

The available heat value of a cord of wood depends also on the amount of moisture present. When the wood is green part of the heat which it is capable of yielding is taken up in evaporating the water. The greater amount of water in the wood the more heat is lost.

Furthermore, cords vary as to the amount of solid wood they contain, even when they are of the standard dimension and occupy 128 cubic feet of space. A certain proportion of this space is made up of air spaces between the sticks, and this air space may be considerable in a

cord of twisted, crooked and knotty sticks. Out of the 128 cubic feet, a fair average of solid wood is about 80 cubic feet.

This, however, applies to the standard cord, in which the sticks are cut to four-foot lengths and piled four feet high and eight feet long. Instead of buying the four-foot lengths, however, most people nowadays have the sticks cut into two-foot lengths by a gasoline saw. This results in a saving of both time and labor. The purchaser should, however, take care to see that he gets full measurement when wood is bought in this way. In parts of New England a stack of 16-inch wood four feet high and eight feet long is commonly sold as a "run," but contains only one-third of a cord.

Where wood is to be burned in a stove or furnace intended for coal, it will be found desirable, the foresters say, to cover the grate partly with sheet iron or fire brick, in order to reduce the draught. If this is not done the wood is wasted by being consumed too fast, and makes a very hot fire which, in a furnace, may damage the fire box.

It is pointed out, however, that heat value is not the only test of usefulness in fuel wood, and since 95 per cent of all wood used for fuel is consumed for domestic purposes, largely in farm houses, such factors as rapidity of burning and ease of lighting are important. Each



Photograph by Western Newspaper Union.

THEY HAVE JOINED THE MOVEMENT TO "CUT-A-CORD" OF WOOD

This picture shows a revival of the old-fashioned chopping bee. Men and women of prominence engaged in the work of converting trees into fuel on the Lincoln estate of James J. Storrow, fuel administrator for Massachusetts. Mr. Storrow turned over 22 acres of woodlot for the use of the Cut-a-Cord Club, the members of which are here shown at work.

section of the country has its favored woods, and these are said to be, in general, the right ones to use. Hickory, of the non-resinous woods, has the highest fuel value per unit volume of wood, and has other advantages. It burns evenly, and, as housewives say, holds the heat. The oaks come next, followed by beech, birch and maple. The white pines have a relatively low heat value per unit volume, but have other advantages. They ignite readily and give out a quick, hot flame, but one that soon dies down. This makes them favorites with rural housekeepers as a summer wood, because they are particularly adapted for hot days in the kitchen. The same is true of gray birch, or "white birch," as it is often called, in the regions in which it abounds. With the resinous pines a drawback is their oily black smoke.

The war has done for the fuel question what it has done for many other national problems. It has focused the attention of the people upon it as a real problem requiring real attention. The labor and transportation difficulties which have resulted in the coal shortage at local consuming points have made many people think about the origin of fuel for the first time. Because of the inability of the railroads to cope with the situation, local wood must become more and more the "war fuel" as the war progresses.

It is estimated that the annual consumption of firewood in this country is about 100,000,000 cords, or about one cord per capita. Allowing one and one-half cords of wood, of any species in general, as the equivalent of one ton of either bituminous or anthracite coal this means the replacement of 66,666,000 tons of coal. As compared to an annual consumption of 500,000,000 tons of coal this is a rather *insignificant* figure, but it must be remembered that the larger part of the coal is used for steam production, for which wood is unsuited. The wood is used largely for domestic purposes and as such is in competition only with the 110,000,000 tons used domestically. In

other words, if the wood were replaced by coal the amount of coal used for domestic purposes would be increased about one-half.

There is no likelihood that wood will take the place of coal to any considerable extent in the large cities, but it is important to know that there is enough wood going to waste in the farm woodlots of the eastern United States to meet the entire domestic fuel needs for the duration of a most protracted war. The problem is how to organize the production and transportation of this wood on a large scale. It is probably conservative to say that 500,000,000 cords of wood could be cut from the farm woodlands of the eastern United States without in any way retarding their growth; in fact to their permanent improvement.

If the exigencies of war force us to burn more wood temporarily they may result in a permanent substitution of wood for much coal hitherto burned in wooded regions far from the mines. It is declared that the forest areas of the United States will undoubtedly be more than able to take the place of our anthracite coal mines; and of bituminous coal we have enough for a long time to come. It has been estimated that the total forest area of the United States will shrink eventually to about 450,000,000 acres, or a fourth of the total land area. Under good forest management an average annual yield of one cord per acre may be expected from this vast forest domain. The war emergency offers an opportunity to clear the woods of a lot of this material, and if properly taken advantage of may be a most important turning point in the whole conservation movement in the United States.

Already it is apparent that problems of financing and distribution must be met by each community. The owners of farm wood lots and large lumber operators must be assured that their cord wood will be taken at prices which will repay them for the work. In some localities



Photograph by Western Newspaper Union.

A SIGN OF THE TIMES

Prof. W. D. Clark, of the faculty of the Massachusetts Agricultural College at Amherst, is an enthusiastic member of the Cut-a-Cord Club and has his inspiration ever before him in the form of a sign posted by the Massachusetts Fuel Administration. His posture proves him to be in deadly earnest.

AMERICAN FORESTRY

such a financial guarantee can be arranged by the Board of Trade or Chamber of Commerce. In others, community wood yards, backed by financial guarantees, will furnish the solution. Wherever possible, however, in the opinion of the New York State Advisory Committee distribution should be taken care of by local coal and



HOW ABOUT YOUR OWN WOODLOT?

This shows a woodlot of young mixed hardwoods. It is in excellent condition and suggests what may and should be done with others. By careful cutting your woodlot can be improved and much needed fuel harvested.

wood dealers, who are already equipped for this work. In many cases they will also be able to make their own financial arrangements.

Canada is substituting wood for coal and planning to meet a far more serious coal shortage next winter, according to information contained in a letter just received by Professor A. B. Recknagle, Forester and Secretary of the Empire State Forest Products Association, from Clyde Leavitt, Chief Forester of the Conservation Commission of Canada. Mr. Leavitt advocates that city and municipal governments appropriate money to build up a reserve supply of wood to be drawn upon when necessary.

"The whole situation has become very critical in many parts of eastern Canada, particularly Ontario," writes Mr. Leavitt. "To my mind all this means that there must be some definite organization for utilizing the large supplies of hardwood available for fuel, but which will

be utilized to only a comparatively slight extent so long as the matter is left in the hands of the regular dealers. They will not lay in large supplies in advance, for fear that the coal shortage may not exist next winter or that the war may end, in either of which events they believe that they would face a material loss due to the reduction in the demand for wood with consequent decrease in the price. My idea is that the city and municipal governments ought to go into the matter definitely and invest a moderate amount of money in building up a reserve of wood, which can be drawn upon whenever the coal shortage makes it necessary."

The War Department is considering cutting a considerable amount of wood on the Pisgah National Forest in North Carolina to supplement the coal supply at the Spartanburg and Greenville training camps. Part of this fuel would be received from those parts of the forest where logging operations have been carried on and would result, it is said, in a more sightly appearance of the cut-over land. It is planned to establish camps of soldiers in the woods to do the cutting. At present there is no shortage of fuel at the camps; and it is likely that a large part of what is accumulated this year will be allowed to season until next winter.



TRY THIS ON YOUR WOODCHOPPER

If you had this fuel pile in your own woodlot you could defy the coal producers and the railroads. The idea is worth trying. If you can try it and do not the Fuel Administrator may get you next winter.



Photograph by Western Newspaper Union.

THE CUT-A-CORD CLUB IN FULL ACTION

These earnest workers are as busy as the men in the trenches—and as necessary to national welfare. They are producing fuel on a large scale and if enough of us follow their example next winter's cold weather will be robbed of much of the terror experienced this winter. The Cut-a-Cord Club was a Massachusetts enterprise originally and its example has been widely followed.

The use of dynamite in converting standing stumps into fuel is receiving attention. An experiment recently worked out by Professor Mandenburg, Forestry Specialist of the Michigan Agricultural College in conjunction with the Agricultural Agent of the G. R. & I. Railway Company will prove of interest. It was demonstrated that there was a large demand for stump wood in the larger cities of Michigan, especially Grand Rapids and Detroit, and that \$2.15 per cord was offered for it by the dealers; that about three dollars' worth of dynamite would blast out and break up stumps containing an average of eight cords of wood.

There are a good many advantages connected with this idea. The clearing of stump land represents an economic gain because after the wood is burned, there still remains the virgin farm land to be used in increasing the nation's food products. Some of the stump wood would have to be hauled by rail but most of such haulage would be purely local and probably mostly by team.

The New York authorities have estimated that the cutting of one cord of wood from each acre of farm wood lots in New York State would in itself save 1,125,000 tons of coal. If coal could be saved proportionately in other states, it can readily be seen that the coal conservation would foot up an immense aggregate and that railroad equipment that could be used for other purposes would be released to the extent of thousands of cars and many locomotives.

At the recent annual meeting of the Massachusetts Association of Golf Clubs, the plan to substitute the axe for the golf club during the winter months was unanimously adopted with a strong endorsement by their Presi-

dent, Henry H. Wilder. The Concord Country Club has acquired woodland adjacent to its course, and the members have cut and stacked 125 cords. Other golf clubs are making arrangements with owners of accessible wood lots, and are cutting in parties in the same manner in which they play golf. Many factories in Massachusetts are sending their employes out to chop wood on workless Mondays.

The College of Forestry at Syracuse University has just called the attention of the county fuel administrator and the president of the Syracuse Chamber of Commerce to an opportunity for securing several thousand cords of wood for local use. A hardwood operator within 25 miles of Syracuse has 3,000 cords of beech, birch and maple slabs which can be loaded at a price not to exceed \$7.00 per cord, provided some additional labor can be secured. In view of the recent order closing the local industries, it is believed that surplus labor may be provided for this operation, in order to secure a continuous stream of hardwood for use in Syracuse as an accessory fuel.

One method of utilizing the vast amount of cordwood material which is found near many towns and cities is suggested in the organization of "logging bees" such as were common a generation ago in some parts of the country. The men of a neighborhood get together with axes and saws and in a short time clear up the dead and down timber on a considerable tract of woodland. In the old days such material was usually piled and burned to get rid of it. It is a fairly simple task now to collect the wood at a central point and saw it up for fuel.

A woodcutting bee was recently held in Old Lyme,

Connecticut, managed by the selectmen of the town. The town bought the wood at \$1 a cord and paid the 60 men who turned out at the rate of \$2.50 for cutting. About 35 cords were cut and this was to be held as a wood reserve by the town to help out the poor. A good community spirit was developed and considerable competition stimulated with suitable prizes. The bee was so successful that there will probably be another one soon in Old Lyme. It has encouraged an effort to be made by the county agents to arrange for a similar bee in other places in the State.

Nearly all the cities and towns in North Carolina now have organized municipal woodyards. In North Carolina the Southern Railway has promised to turn over the discarded ties to the Fuel Administration, and it is reported that other railways within the State have agreed to cease burning such ties as waste material and save them for fuel. It has been estimated that fifty million wooden ties are discarded every year by the railroads of the United States—equivalent to 1,700,000 cords of firewood.

A member of the Empire State Forest Products Association, conducting a large lumber operation on the southern side of the Adirondacks, has offered to turn his entire crew to the work of cutting cord wood during slack periods. He now has piled on skids near the railroad a large quantity of hard wood logs for which the market at present is not normal, and he is willing to convert them into cord wood. It is estimated that this offer will make available 7,500 cords of wood for Utica and the other cities of Oneida and Herkimer counties. From all parts of the Adirondacks stumpage is offered in both large and small blocks, aggregating hundreds of thousands of cords. Reasonable prices are asked in nearly every case, while some are merely nominal. Many landowners offer wood for local use free of charge. In many places the lumber operators have already taken steps to meet local needs.

From Boston comes word that Harvard students are now cutting cordwood. The Massachusetts Forestry Association and the Massachusetts State Forest Service are responsible for the transition from dress suit to corduroys. A crew of fifty husky young athletes recently started to work chopping red and white oak of the woodlots on the Cedar Hill Farm, near Waltham. The boys work from eight o'clock in the morning to half-past four in the afternoon. They are under the charge of an experienced forester. The boys receive \$2.50 a day, and the State is glad to get them.

As a contribution to the fuel situation H. Clouston, of Buffalo, New York, has patented a device for burning sawdust. He writes that it may be attached to any stove or furnace and that when filled with dry sawdust it will feed automatically and maintain a fire for ten hours without attention. Mr. Clouston urges that if sawdust were dried and packed in paper sacks for sale through grocery stores good use could be made of a waste product of tremendous value. He argues that sawdust is cheap, clean and effective as fuel.

In a recent bulletin the United States Department of Agriculture points out that "because of reluctance to make an increase of unnecessary work, many wealthy people hesitate to remove dead and unsightly trees from their grounds and premises. They feel that such improvement work is a luxury which can well be deferred to a later time when there is no such great demand for urgent war work. Their motive is a patriotic one and is to be commended; but in most localities it will be found that such trees can be used, and in fact are often sorely needed for fuel. With this view, the improvement work can be combined with the production of fuelwood and no labor will be diverted from useful work. It is urged, therefore, that such owners consider this phase of the question and plan accordingly. Obviously this source of fuel supply will not damage the woods or detract from the beauty of the landscape. It is simply utilizing waste wood and keeping the improvements of the estates up through the period of the war. Owners and managers of woodland estates are directed to this view of the situation in connection with present improvement work."

It is not expected by the authorities that fuel cutting should be done at random. To prevent haphazard cutting and to insure best results the Fuel Administration, the United States Forest Service and other agencies, are co-operating to provide expert direction for the work. Those planning to cut wood are urged to secure specific information from reliable foresters. In each state having a State Forester application should be made to that official. In other states application should be made to the county agent, the State Agricultural College or to the Forest Service at Washington, D. C. Expert direction will be furnished free of charge.

To guide the general farmer in securing this fuel wood, the forestry department at Iowa State College has issued the following general directions:

1. Take out the fallen trees which have not decayed to such an extent as to render them unsuitable for fuel purposes.
2. Remove all dead standing trees, such as have been killed through the action of surface fires, insects or diseases.
3. Remove trees which have been broken by wind or in other ways, so as to leave them in poor condition for future growth.
4. Remove the inferior species of timber where their growth is interfering with the growth of other more desirable trees.
5. Remove a part of the most desirable species in the stand when the trees are spaced too closely together for best development.

Care should be exercised at all times in cutting timber from steep slopes. It is usually desirable to keep a heavier stand of timber on steep hillsides than on more level areas, since often destructive soil erosion results from excessive cutting on a hillside.

HERE is another war use of forest products. A planing mill company in Oregon has recently received an order for 1,000,000 tent pins from the United States Government. The pins are to be 24 inches long and will be made of maple and ash. Four months will be required to complete delivery.

THE KINGFISHERS

(Family Alcedinidae)

BY A. A. ALLEN, PH.D.

ASSISTANT PROFESSOR OF ORNITHOLOGY, CORNELL UNIVERSITY

WETHER sitting patiently on a branch overhanging the water or dashing up the stream with a wild rattling cry, the kingfisher always demands attention. His curious shape, due to his large crested head, long bill and short tail, his striking coloration, his interesting habits and the natural charm of his habitat, all combine to make him one of our most attractive and best known birds. It is the same the world over. The members of the kingfisher family, of which there are nearly 200 species, are beloved by all peoples. It is little wonder that many legends have grown up about them. The Halcyon Days of Greek mythology, for example, were the fourteen days in winter when Aeolus, the god of the winds, kept the weather calm so that the floating nest of the kingfisher could ride safely over the sea. The birds themselves were Ceyx and Alcyone, the latter the daughter of Aeolus, whom Zeus had changed into kingfishers. In the days of Shakespeare the dried body of a kingfisher was supposed to keep moths from woolen garments or, if suspended from the ceiling, to point its bill in the direction of the wind.

While the kingfishers are almost all brilliantly colored, they are not all alike in habits but are divided into two natural groups,

the wood-kingfishers and the water-kingfishers. The former frequent woodlands, open country, or even gardens, where they feed upon insects, crustaceans, frogs, lizards, or even small birds and mammals, and only occasionally take fish. The latter group, like our American bird, frequent streams and lake shores and feed almost entirely upon fish, although frogs, crayfish and aquatic insects are sometimes taken. The majority of the wood-kingfishers are extremely brilliant, metallic greens and blues, satiny whites, russets or reds predominating. One genus of about twenty species, found in India and the Malay Archipelago, have elongated central tail feathers which are enlarged at the tip or racquet-shaped. One of the largest and best known species, however, is much duller. This is the famous laughing jackass of Australia and New Guinea, a bird nearly as large as a crow with a much heavier bill. It is brown above and grayish white below, this color extending around the neck and in a broad band over the eye. A little greenish blue on the lower back and in the wing enlivens the otherwise plain attire. The name Laughing Jackass is derived from its loud gurgling, laughing note which sounds "as if a troop of fiends were shouting, whooping and laughing."



ARMORED PRINCES
The feather sheaths on young kingfishers do not break open until the feathers have nearly matured and for a time the youngsters seem to be encased in curious coats of mail.



TWO WEEKS LATER—THE TRANSFORMATION
The feather sheaths have broken and the young kingfishers now resemble the old birds. There is no juvenal plumage as with most birds, males and females are both bright and a dull plumage is never assumed.

about one. It is a tame, stupid bird and rather inquisitive, coming about camping parties and watching all that transpires with apparent interest.

The common kingfisher of Europe, and the only one found in the British Islands, is one of the water-kingfishers with habits much like our American bird. It is much smaller, however, only seven inches long, and more striking, being bright azure blue above and rusty orange red beneath. It is considered the most brilliant of the British birds.

All kingfishers nest in holes, mostly in perpendicular



PHOTOGRAPH TAKEN BY A KINGFISHER

Returning to its nest, the kingfisher found this branch, his favorite perch, occupied by the pair of rough-winged swallows. He then attempted to alight on the thread which manipulated the shutter of a camera focused on the branch and in so doing took this interesting picture of the swallows.

banks of streams, but some species nest in walls, trees or stumps, and all lay pure white eggs. Usually no nest is built, although sometimes a few straws or bones of the fish which they have eaten cover the floor of the cavity.

Young kingfishers are naked when hatched, lacking even the sparse down which is characteristic of most young birds. They likewise omit the juvenal plumage, for the first feathers which they wear are those of the adult birds. As with young cuckoos, the feather sheaths do not break open until the feathers have nearly matured, and, for a time, their bodies are encased in the same curious coats of mail.

With most species of kingfishers the males and females are very similar or the females may be a trifle brighter than the males. This is very uncommon among birds, for if a species is brilliantly colored the bright feathers are usually found only on the male and the females are much duller. With birds that build open nests this is necessary, for bright colors would call attention to the female while incubating and result in her destruction. With birds that have always nested in cavities, so that

the female is entirely out of sight while on the eggs, there is no such need for protective coloration and the females are often brilliant. Among our American birds we find this to be the case with the woodpeckers as well as with the kingfishers. Among tropical and Old World species there are many, such as the trogons, toucans, hornbills, bee-eaters, rollers, etc., in which the females are as bright as the males. These birds have probably always nested in cavities and never developed the nest building instinct.

All of the New World kingfishers, and there are but seven species, belong to the fish-catching group. They are either blue or bright green above, and white or russet below and vary in size from the little South American orange-and-green kingfisher which measures scarcely five inches in length to the large ringed kingfisher that occurs as far north as Southern Texas and measures 16 or 17 inches.

The only species found in North America, north of



QUEEN OF THE FISHERMEN

As shown by the double band across its breast, this is the female kingfisher. She has a small sucker in her bill for her young.

Texas, is called the belted kingfisher. It is about 13 inches in length, but, because of the shortness of its tail and the heaviness of its body, it appears larger than the measurement would suggest. It is found in summer along streams, or about lakes and ponds, from Northern Alaska to the Gulf, and in winter, commonly from Ohio to Northern South America. Occasionally it winters as far north as New York or New England where it can find open water.

The kingfisher is bluish gray above and white below, the white of the underparts extending around the neck in a broad ring. Across the breast and down the sides is a bluish gray band which, in the female, is tinged with rusty. The female, moreover, has a secondary band of rufans below

the gray band. The head of both the male and the female has a curious double or interrupted crest which is always erected when the bird is at all alarmed or nervous.

The kingfisher has two methods of fishing, either waiting on a branch or projecting rock over the water for its prey to swim beneath, or flying rather high over the water until it locates a fish swimming near the surface when it hovers for a moment on rapidly beating wings. In either case the plunge is made head foremost, with closed wings, and the fish is speared with the sharp javelin-like bill. The bird itself is carried entirely beneath the surface of the water by the force of the fall but, rising immediately, it returns to its former perch, juggles the fish about until it gets the head directed downward, and swallows it entire. The size of the fish which can be swallowed is quite surprising. The indigestible bones and scales are later ejected from the mouth, much as in the owls, in the form of pellets.

The kingfisher always nests in a hole drilled into the perpendicular bank of a creek or sometimes far from



A CHIP OF THE OLD BLOCK

Young kingfishers resemble their parents not only in color, but also in disposition. They are wild, independent and noisy.

water in a gravel pit or railroad cut. The hole is usually within a few feet of the top of the bank and is directed inward and upward for from four to ten feet and enlarged at the end. No nest is built, but the bones of fish which it has eaten often line the cavity. In drilling the kingfisher uses its bill and pushes the soil out with its feet.

The feet of the kingfisher are small for the size of the bird and, as in all other members of the family, the front toes are grown more or less together. Possibly this assists them in pushing the soil from the cavity as they dig. At other times, however, the feet are little used except for resting, as the birds never hop or run, and there is reason, therefore, for their lack of development. The young kingfishers rest on the whole tarsus

which has become calloused so that it looks like the sole of most bird's feet.

Kingfishers usually return to the same bank year after year but they always drill a new hole. In the accompanying photograph of a railroad cut, the holes made by a pair of kingfishers for several years can be seen. The camera, concealed by grass, and focused upon a branch beneath the hole that was being occupied, will be noticed. The author lay concealed in the field on the opposite side of the cut with a thread attached to the shutter. Thus he secured the photo-



PLAYING POSSUM

If laid on its back a young kingfisher remains motionless with its head on one side and feet up in the air. The calloused pads on the tarsus, as well as the toes, can be seen. Young kingfishers normally rest on the tarsus, and the toes are weak and incapable of grasping.

graph of the kingfisher with the fish in its bill when it returned to its nest and paused for an instant on the branch.

A pair of rough-winged swallows which were nesting in one of the previous year's holes utilized the same branch as a convenient perch. Once when the kingfisher returned they were both perched upon it. Finding his perch taken and looking for a place to alight, the kingfisher espied the thread stretched from the camera shutter across the cut and attempted to alight upon it. In so doing, the weight of his body pulled upon the thread, releasing the shutter, and took the photograph of the rough-winged swallows here shown.

Kingfishers are wary birds and no matter how carefully one approaches, they will permit one to reach only a safe distance before flying off, with a loud rattling cry, to their next perch. They usually have a number of favorite perches along a stream but their hunting range is rather limited and when frightened up stream from one perch to another, they soon make a wide detour back to their starting point. Their flight is strong and direct, and when coming head-on is so very ducklike that hunt-

ers have been known to actually fire at them, thinking until too late, that they were ducks.

About trout streams or artificial ponds, where valuable fish are being raised, the kingfisher is sometimes quite destructive to the young fish. It is therefore not protected by law. In most places, however, the fish taken are minnows or suckers or others of little or no commercial value. The kingfisher is far too picturesque

a bird to warrant wholesale destruction. Even the most careless gunners and the most inveterate fishermen seem to have a wholesome, friendly interest in this little pirate of the stream, so that relatively few are shot for the mere sake of killing. It is probably for this reason, in addition to its wariness, that it is still a common bird wherever there are suitable conditions for food and nesting.

FOOD CONSERVATION IN BIRDLAND

BY H. A. ZIMMERMAN

THE question of food waste has become a vitally serious one since the great war began. Even the churches have been called upon to urge economy in food, and can it be possible that the birds are going to set us an example in this line? Judging from the picture it would seem so. We are at a loss to understand why this mother thrasher should thrust her head so far into her baby's mouth unless she fears that some of the precious morsel she is feeding her should fall to the ground and be lost. At any rate the mother is making sure that the worm will reach the right spot. It will be noticed that the baby has a pretty capacious "take-in" for one so young.



IS IT A LITTLE SUFFRAGETTE?

No, the mother bird did not discover traits of latent militancy and this is not the end of a "hunger strike"—it is merely her usual breakfast of a fat, wiggly worm.

DUCK FUTURES

IN NORTHERN New Mexico, on the Jicarilla-Apache Indian Reservation, there is a beautiful mountain lake, which the Indians have named Stinking Lake by reason of gases given off by a nearby mineral spring.

This lake is a great breeding ground for ducks and other wildfowl. It has been called "the greatest natural wonder in New Mexico;" 7,000 pairs of birds are said to nest there. A large proportion of the ducks which migrate northward and southward along the Rio Grande and the Rio Pecos are raised at Stinking Lake.

The New Mexico Game Protective Association wants this lake set aside and developed as a National Bird Refuge, to be used for all time as a great breeding ground for the birds which supply the citizens of New Mexico and Texas with pleasure and healthful sport. They regard it as a public "duck factory."

Comes now the Jicarilla "Sanctuary" Association, an organization composed of wealthy Coloradoans, and asks that the lake be leased to them by the U. S. Indian Service as a private shooting club.

A Bird Refuge and a shooting club are mutually exclusive. The lake can not be used for both purposes. "Who is the best man?" Both parties are doing their best to promptly decide this question.

The controversy clearly involves the elementary principle that superlative natural wonders should remain in public control. To the degree in which New Mexico derives her wildfowl from this lake it also involves the principle that monopoly in sources of raw material, whether that material be coal, water power, or ducks, will in the long run prove incompatible with the public interest. No statement of charitable intention, as implied by the name "Sanctuary," and no eminence of character on the part of the membership of this shooting club, can cloud the fact that these principles are at stake.

The cropping up of this issue in the field of wild life conservation leads to the hope that it will be fought out there to a prompt decision. We recommend to the Commissioner of Indian Affairs, and to the U. S. Biological Survey, that they decide this controversy with their eyes open.

STUDIES OF LEAF AND TREE (PART II)

BY R. W. SHUFELDT, C. M. Z. S.

THROUGHOUT the range of their distribution, nearly every one is more or less familiar with the magnolia trees; and those who have given the subject any attention will be able to tell how to distinguish them. In the first place, the Magnolia family (*Magnoliaceae*) contains but two genera of trees: the *true* magnolias (*Magnolia*), of which there are some fifteen species, and the Tulip tree or Yellow Poplar (*Liriodendron tulipifera*), of which there is but this single species. Figs. 17 and 18 are here introduced to illustrate the magnolia trees, while the tulip tree will be touched upon in Part III. of the present series of articles.

From whatever angle we view the magnolias as a group, they are interesting and inspiring. Their unusual forms; their superb flowers (in several of the species), as well as their gigantic leaves and general coloring, will appeal to any one capable of being swayed through such influences. We have no trees growing wild in this country having larger flowers, or more striking characters than these; moreover, magnolias are an extremely old group geologically; and, largely through the Northern Hemisphere, we have discovered in places enormous forests of these trees in a thoroughly fossilized condition. Upon being studied and compared, they point undeniably to the conclusion that in those early ages of the world's history magnolias of various species flourished abundantly within the Arctic circle, and from thence outward to the Equator. Their present-day representation is but a fraction as compared with the grand army of their ancestors of past ages.

It was established long ago that the wood of the magnolias was of little or no use to man, so the use of the trees for commercial purposes has practically been abandoned. Some of the species, however, are suffering

severely on account of being used in other ways—entirely unnecessary ones, unfortunately. In the case of the Great Laurel Magnolia (*M. foetida*) for example—one of the splendid southern species—there is, at Christmas, an enormous demand for its elegant evergreen foliage—leaves so dark and glistening that even a savage appreciates their beauty. But no such sentiment stirs the average negro of the Southern States; at the season mentioned, he resorts to the localities where these trees grow in numbers, and, not satisfied to patiently pluck the foliage from the trees, he deliberately hews the trees down in scores. Through this vicious practice magnolias are now practically extinct in vast areas. These holiday festivities are responsible for similar ruthless extermination with respect to several other kinds of trees in the country—our beautiful holly among the number; and the State and Federal foresters should combine to put a stop to this species of wholesale vandalism.

The flowers of these trees will not ship safely for decorative purposes, as they are readily bruised, and spoiled through consequent discoloration; while the various kinds of magnolias stand among the most attractive and striking of America's ornamental trees, and their employment as such should be encouraged in every possible way. One species, much used for such purposes in Washington, is particularly attractive for the rea-

son that its flowers appear in all their beauty the first thing in the spring—quite a long time before the leaves are in any way in evidence beyond the big, shiny buds on the twigs and branches. Some of these are exotic species, of which we have quite a number; but the limitations of space debar any description of these at present. Later on the subject may be taken up.

One of our indigenous magnolias is easily distinguished



THE SWAMP MAGNOLIA IN FLOWER (*Magnolia glauca*). FROM THE SHAW LILY PONDS NEAR WASHINGTON, D. C.

Fig. 18—The flowers of this elegant tree are very fragrant and of beautiful formation.

AMERICAN FORESTRY



UNDER VIEW OF OAK LEAVES; NATURAL SIZE. UPPER LEAF IS OF THE WHITE OAK (*Quercus alba*), AND THE LOWER ONE OF THE SCARLET OAK (*Quercus coccinea*).

Fig. 20—These specimens show very well how leaves should appear after they are pressed and dried, and ready to be placed in the herbarium folio.

by its leaves; this is the Eared or Mountain magnolia, so named for the reason that its acute, obovate leaves develop little twin "lobes" at their bases, which present a fancied resemblance to the lobe of the human ear. It flourishes through the valleys of the Appalachian mountains, in the mid-section country, to northern Mississippi and Alabama. It has a fine, creamy white flower with a rich, aromatic fragrance, and many of them measure fully ten inches in diameter. This tree has been cultivated in some of the New England States for many years, and it has done exceptionally well as an ornamental tree. Its oblong fruit is, when matured, of an elegant rose tint; while its leaves, as in a few other species, retain their green color until they fall, and even for some time afterwards. Scientifically, this Eared magnolia is known as *Magnolia fraseri*; and it is a well known fact that its flowers, instead of possessing a sickening odor, which is the case in those of the Great or *the* magnolia, are, as stated, delightfully fragrant. The Great magnolia has been named *Magnolia foetida*. Through the use of its wood for fuel and its branches for Christmas decoration, the species is now becoming extinct. Man is utterly destroying so much that is beautiful in nature, and so much that can never be restored.

One of the most attractive of all of our magnolias is the Swamp magnolia (*M. glauca*), a species that occurs in localities suitable for its growth, throughout the Gulf States to Texas, northward to Arkansas, and on the Atlantic coast from Massachusetts to Florida (Fig. 18). Manufacturers use its wood to make broom-handles and various small utensils for our kitchens;

while the tree is, as are other species, disappearing owing to the demand for its branches in church decoration. It is a grand tree, and frequently grows to become 75 or 80 feet in height. During its flowering season, its blossoms are sold by the thousands by vendors on the streets in many of our cities, in the region where the trees may still be found. It is a regular trade and a very profitable one; and magnolia farming would by no means be a hazardous venture, were it entered upon with a correct knowledge of requirements and the demands of the market. Better do this than wipe out the species in nature. The Umbrella tree (*M. tripetala*) receives its name from the fact that a great whorl of umbrella-like leaves encircle its beautiful flower.

A most important group of trees represent the Beech family (*Fagaceae*),—the oaks of the genus *Quercus*. Of all trees in the country, none is more puzzling to the student, and for not a few reasons. In the first place, some of the species rather closely resemble each other—especially their acorns and leaves. Then a number of species flourish in the same localities and forests, thus giving rise to many bewildering hybrids. Finally, the same species often presents curious anomalies and variations. Great and far-reaching attention has been devoted to the oaks on account of their great value to man, who has used their wood, bark, and nuts as far back into human history as the records carry us.



UNDER VIEW OF THE LEAF OF THE RED OAK (*Quercus rubra*)

Fig. 21—As in the case of all oaks, we cannot study and compare their leaves too closely in order to make absolute correct identification.



UNDER VIEWS OF MORE LEAVES OF THE RED OAK (*Quercus rubra*), SHOWING VARIATIONS IN FORM. DISTRICT OF COLUMBIA SPECIMENS.

Fig. 22—As already pointed out, the leaves of oak trees offer an almost endless series of variations in form and other characteristics.

In a brief article, with instructive illustrations, the hybrids of our oaks are beautifully presented in *AMERICAN FORESTRY* for November, 1917, by Mr. George B. Sudworth, who covers the subject quite fully for a new sub-species, and throws much light on the hybridization of these trees in general.

Oaks are the only trees now in existence in the world the fruit of which takes the form of an acorn; while so characteristic are their leaves that nearly everyone can distinguish any kind of an oak leaf the moment he sees it. Most oaks are a quarter of a century old—or rather less—before they begin to bear acorns; but they all produce these in due time—no known species being lacking in this particular. The general characters of oak leaves, with respect to form, are well shown in a number of the figures of the present article, a sufficient array having been selected in that their variations may be advantageously studied. Their *sinuses* will be seen to vary widely owing to the differences in their lobing (Compare figures 23 and 24). Dendrologists, or scientific students and describers of trees, have listed over three hundred different kinds of oaks, and no doubt many new ones will be described by botanists of the future.

With respect to the distribution of oaks, it may be said that the trees of this genus flourish throughout extensive areas from one end of the Northern Hemisphere to the other. In Central America various species carry this distribution to the Equator; and here they cross on the mountainous ranges, to occur down through the Andes for some considerable distance. In all these countries, the wood of most of



UNDER VIEW OF A TYPICAL LEAF OF THE SCARLET OAK (*Quercus coccinea*). DISTRICT OF COLUMBIA SPECIMEN

Fig. 23—This average example is useful when one comes to study the leaves of this species with the view of considering the great number of variations these leaves offer the student.



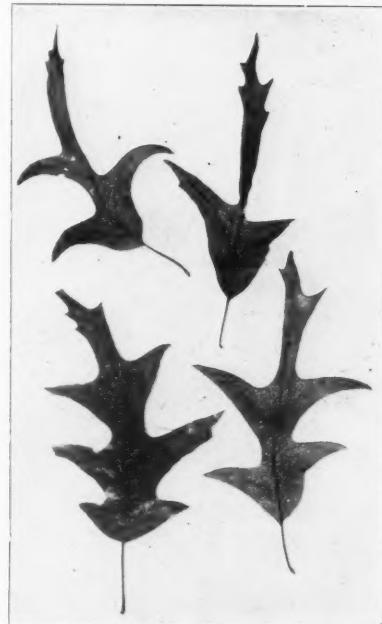
VARIATION IN THE LEAVES OF THE POST OAK (*Quercus stellata*); UNDER SIDES. WASHINGTON, D. C.

Fig. 24—As in the case of all oaks, the leaves of this species vary in outline quite as often as any other; so great is it sometimes that correct identification becomes quite puzzling.

while the clusters of the pistillate ones are few in number, and are to be found in the leaf-axils.

Apart from *Pasania* of Oregon and California (*P. densiflora*), the common tan-bark oak of the Pacific coast, the remainder of the United States species are usually divided into two groups, both falling within the genus *Quercus*; these are known as the White Oak group and the Black Oak group. In the case of the first, of which the White Oak (*Quercus alba*) is the type, the bark is very pale colored, and the leaves have rounded lobes and sinuses. In the Black Oak group the bark is always dark-colored, and the leaves, or rather their lobes, are sharp-pointed, the points terminating in sharp little prickles, as in *Q. velutina*. All the White Oaks are annual-fruited, and all the Black Oaks biennial-fruited. Gray tells us that "all the species incline to hybridize freely."

As all good foresters know, one of our grandest oaks is the Scarlet oak (*Q. coccinea*), a fine example of which is here given in Fig. 19; variations in its leaves are shown in Figures 20 (lower one) and 23 (typical). The



GREAT VARIATION IN THE LEAVES OF THE PIN OAK (*Q. palustris*); UNDER SIDES

Fig. 26—It would probably require several hundred fully matured leaves of this species of oak in order to exhibit the extraordinary number of outlines they may present.

the oaks, if not of all, is held in high esteem for its durability and strength—few products of the kind equaling it commercially.

There are said to be upwards of fifty species of oaks described for this country, the forms on the Atlantic and Pacific sides being quite different; the indigenous species are restricted to their original areas of distribution, unless collected therein by man and planted elsewhere.

A good example of oak flowers is here shown in Fig. 30, which is surely an interesting and graceful display. These are the *staminate* flowers,



SPECIMENS OF SCARLET OAK (*Q. coccinea*); SHOWING FORMS OF ACORNS AND LEAVES

Fig. 27—The acorns of any oak are of great value in determining the species; they never vary to the extent the leaves do, which is very fortunate for the student of this puzzling group.

finest specimens of the scarlet oak grow in light, dry soil, and the species has a wide distribution in the East, being found in suitable localities from Maine to Minnesota and southward.

Julia Rogers says: "The splendor of our autumnal forests owes much to the foliage of the scarlet oak. The tree blazes like a torch against the duller reds and browns in the woods, and often keeps its brilliancy until after snow covers the ground."

It is only within recent time that the merits of this species as an ornamental tree have been fully recognized; but its reputation as a rapid grower and a very hardy tree is now spreading. Perhaps the finest specimens of it in this country are to be found growing in the lower valley of the Ohio River; and, aside from the White Oak (*Q. alba*) and others, no wood of all the oaks is in greater demand, it being a close second, if not an actual equal of the red oak (*Q. rubra*).

Beyond all comparison, the grandest tree in our American forests, and unexcelled in the matters of vitality, dignity, and strength, is the White Oak (*Q. alba*), and it is far and away ahead of any species in its own particular genus. Sometimes, to be sure, we may come across small and scraggly specimens—deficient in beauty of contour; but even so, they are invariably picturesque, contributing their share to the loveliness of the woods in which they occur. Acorns of this tree are well shown in Fig. 28, while a handsome specimen of its leaf may be studied in Fig. 20—the upper one.

Giant specimens of the white oak may occur that have attained a height of over one hundred and fifty feet, with an average diameter of seven feet from ground to lowermost branches. Trees vary in contour, depending upon their

growing out in the open, or among other trees in the forest. In the former case they are generally shorter, more symmetrical and spreading, having a rounded contour. White oaks occur over nearly all the eastern part of the United States, and the wood furnished by the tree, including even that of the roots, is the finest that American forests can produce. Its uses are altogether too numerous to be listed, as they range all the way from the substantial wooden parts of a battleship to a dining room table. Tanneries use tons of the bark in making high-class leather, and in not a few parts of the country the nuts are gathered to be eaten during the winter. It is an historical fact that in

colonial days Indians, as well as the colonists themselves, ate the acorns of the white oak.

Another notable oak is the Post oak, by some called the Iron oak, since its wood so stubbornly resists the rotting process of soil and water, when it is used for either subterranean or subaqueous purposes. Scientifically, it is known as *Quercus stellata* (Fig. 29), and the tree rarely exceeds fifty feet in height. We find it growing all the way from southern Massachusetts to some parts of northern Florida, thence westward to Texas, where it is more common than over its eastern range. It often passes for white oak among lumbermen, and in many things for which oak is demanded it is equally good. Like the white oak,



UNDER SIDE OF A LEAF OF THE LARGE-LEAVED MAGNOLIA OR CUCUMBER TREE (*Magnolia macrophylla*). GREATLY REDUCED

Fig. 17—The leaves of this tree sometimes attain a length of over 30 inches; it is a remarkable sight to see them all on the ground in the autumn.



ACORNS OF THE WHITE OAK (*Q. alba*); WASHINGTON, D. C.

Fig. 28—The acorns as well as the leaves of this species of oak tree are quite characteristic, and not easily confused with any other.

its acorns are edible, and the tree holds its leaves all winter.

The Chestnut oak was referred to in Part I. of the present series of articles, while the Pin oak has not yet been mentioned beyond the matter of its classification. Linnaeus named this species *Quercus palustris*, and it has also been called the Spanish oak or rather the Swamp oak. Several of its characters are so distinctive that but little trouble is experienced in distinguishing it from our other oaks. It is our most abundant species, lining some of the handsomest streets at the National Capital; and in the winter time one may easily recognize it by its distinctly pyramidal form. Its leaves, which are scarlet in the fall, vary in their outlines to an enormous extent. Some of these variations are seen in Fig. 26, while thousands of others might be gathered, no two of which would be more alike. As to their lobing, the sinuses may be 5 or 6 or 7, and sculpt quite to the midrib. In summer these leaves are very shiny on their upper surfaces and rather dull on the other side. The acorns of the pin oak are very bitter to the taste; they are characterized by very shallow cups, hairy lined, and thickly overlaid externally with reddish-brown scales. They ripen during the fall of the second year; but it is an acorn that never seems to be especially abundant. With respect to the distribution of this oak, Gray tells us that it is "found on low ground, chiefly on the coastal plain and in the Mississippi Basin; Massachusetts to Virginia; west to Kansas and Arkansas." Frequently it is planted as an ornamental tree

on lawns, and for its beauty and shade on city streets. Pin oak shingles and clapboards for country houses are held to be among the best for such purposes; the wood is also used extensively in other ways—for making barrels, interior and exterior construction, and so on. It wears splendidly, being very tough and hard, of a pale brown shade, and a varigated, coarse grain, which takes a good finish.

"The leaf might confuse us," says Julia Rogers, "but the pin oak tree tells its name before one is near enough to see the leaf distinctly. The tree has a broad pyramidal form, with slender branches stretched out horizontally as far as they can reach. The spur-like little twigs that cluster on the branches throughout the treetop are choked to death by being crowded, but they remain—the 'pins' that characterize this species of oak. When it gets old, the pin oak loses some of its symmetry and beauty; it holds on to its dead branches, but there is a dignity in its bearing that is admirable, even in its decline."

One of the most variable oaks we have—especially with respect to its foliage—is the Spanish oak (*Quercus falcata*); this is the *Q. digitata* of Sudworth, and the *Q. pagodaefolia* of Ashe. We find it distributed from



A FINE BEECH TREE IN THE VERY EARLY FALL, JUST AS THE TREES COMENCE TO "TURN." ROCK CREEK, NATIONAL ZOOLOGICAL PARK, WASHINGTON, D. C.

Fig. 33—On account of their being so carefully guarded and cared for, the trees of this famous park stand among the handsomest in all the country round. Then, too, their beauty is enhanced year after year.

New Jersey to Florida, and from Missouri and Texas, preferring dry or sandy soil. This species is also variable with respect to its size, or it may grow to be very large and tall, as was the case with the one from which the acorns in Fig. 29 were taken. The tree is most abundant in the southern part of its range, particularly in the Carolinas, as well as in some of the



ACORNS OF THE POST OAK (*Quercus stellata*); WASHINGTON, D. C.

Fig. 29—Here is another acorn that need not give any trouble; most certainly not if one has the leaves of the oak at hand that furnished the specimens. The tree from which these were taken was very large and tall.

Gulf States. Some consider its wood equal to that of the white oak; and there is no question but that its bark is one of the best we have in the country for tanning.

As already pointed out, the remaining genus of trees in the Beech family (*Fagaceae*) is the *type* genus, *Fagus*, created to contain the beech or *Fagus grandifolia*, of which Gray gives but one variety, *F. g. caroliniana*. There is another species of beech in Europe, with three others in the Orient (Figs. 31, 32, and 33).

Beech trees, beech leaves, and beech nuts or mast, are all so well known to every one in this country who cares at all about trees, that specific descriptions of them would seem to be



RED OAK (*Q. rubra*) IN FLOWER

Fig. 30—The tree from which this was taken in the early spring presented a sight not easily forgotten. It has a height of nearly one hundred feet, and thousands of these delicate catkins hung from the ends of its twigs.



AN IMMENSE SCARLET OAK (*Quercus coccinea*), ON THE FIRST HIGH HILL DIRECTLY SOUTH OF PIERCE'S MILL, WASHINGTON, D. C.

Fig. 19—This is one of the finest species of oaks we have. In the autumn, when the leaf-change is well established, it is a marvelous sight to note the royal splendor of their massed, scarlet leaves, among trees whose foliage is principally tans and browns.

quite superfluous. Within miles of city or town, the tree has hardly come to be full grown before its entire trunk is covered with carvings of every description—chiefly the initials of the carvers; various symbols, and other curious dendroglyphs—if it be permissible to coin a word for them. The majority of these generally indicate that, in the spring the young man's mind has a certain gentle inclination that ages ago became proverbial. It is the rarest thing to meet with a beech not so dealt with; and when we do, there is generally some good reason for it—as a rule it is under some sort of protection.

Many rodents and birds, such as blue jays, feed upon these triangular, four-valved burs, and have done so for

thousands of years in the past. Man did the same, ages and ages ago, but rarely now. Still, the tree is of great value to him, for the mast is used for other purposes. The wood is used for making chairs and many other things. In the country, the leaves are occasionally employed to stuff mattresses, and the nuts are fed to hogs to fatten them during the early months of winter. Often, too, in some parts of the Union, beech trees are planted for their beauty and for the splendid shade they give. Our beech is distributed pretty generally over Eastern United States; and it is to be observed that it seems to prefer the neighborhood of stream and river bottoms, especially if the soil be rich and suited to its needs. With her usual keen sense of observation, Julia Rogers describes the growing of the young beeches: "In April and May we may see the germination of the beech nuts. The gaping burs and three-cornered nuts lie in plain sight under the tree. A nut splits along one sharp edge and a slender root protrudes. It grows downward and burrows in the leaf mould. The stem



THESE ARE THE BUDS OF OUR BEECH TREE (*Fagus grandifolia*) OPENING IN THE SPRING; ITS DESCRIPTION MAKES A WHOLE CHAPTER IN THE STORY OF THE PHENOMENON OF TREE GROWTH

Fig. 32—It is not altogether a bad plan to carefully gather leaves at this tender stage and press them, in that their forms may be exhibited and displayed in the herbarium folios for comparison with those of other species.

emerges at the same time and place, and extends in the opposite direction. It is topped by a crumpled green bundle, which unfolds directly into a pair of short and broad seed leaves, totally unlike the leaves of the beech tree.

"In this case the triangular shell clings but a little while to the growing plantlet. Oftener, however, the opening is just wide enough to let the root out. Then the stem carries the shell up and wears it like a helmet until the leaves within spread themselves and cast it off." Thus we have the starting of the tree; but the story from this stage on is quite a long one,—that is, to carry it to the point where the young beech in any way resembles the parent tree. Too long to tell just now.

As a matter of fact, the best way to study such growths—and it is interesting as well as important—is to take a lot of ripe and sound beech nuts and plant them in some proper receptacle, with rich earth of sufficient depth,



THERE ARE NO MORE BEAUTIFUL TREES IN THE WOODS THAN THE AMERICAN BEECH (*Fagus grandifolia*) AT ANY STAGE OF ITS GROWTH

Fig. 31—These are some of its exquisite light tan-colored leaves in the autumn. We are all familiar with the peculiar beauty they lend to the forest at this time of the year.

watching the entire process of growth and evolution. They may be placed alongside acorns of a few species, chestnuts and chinquapins; the sprouting and growing nuts offer a most instructive object lesson.

It will be remembered that the acorns of the chestnut oak sometimes sprout before dropping from the trees; still, there is no trouble in finding sound ones on the ground—those which have not yet sprouted.

Before closing our chapter on the *Fagaceae*, it will be as well to mention another product of the oaks which possesses a marked value commercially, and which has not, up to this point, commanded attention. Reference is made to the "galls" of the oaks, sometimes called

"oak apples," nutgalls, or gallnuts. These excrescences—running from the size of a large pea to a hazel nut—are found on the leaves, twigs, and even on the trunks of many species of oaks. They follow the deposition of the eggs of certain insects—a process accompanied by a peculiar virus, the gall being subsequently stimulated in its growth through the irritation caused by the presence of the larva. These insects are commonly *flies* which belong to the family *Cynipidae*—*Cynips quercus inanis* being the principal one to inflict the wounds.

Galls have a bitter, astringent taste, and are chiefly used for the tannin they yield, also the gallo-tannic acid of commerce. Many of them reach this country from various parts of the world, as China, Syria, Bokhara, and so on; they vary in form, size, and color, as well as in other qualities—traders knowing them under the names of white, blue, and green galls. It would be interesting to know to what extent oak galls are collected in this country to supply the trades, professions, or for other commercial purposes.

THE GIANT MADRONA OR ARBUTUS TREE OF CALIFORNIA

THE GENUS really belongs to the Old World. Asia has its species, and Mexico claims one or two representatives, but the pride of the family and the delight of arboriculturists is the strong, healthy and handsome child of the west coast. It is often eighty to one hundred feet high, three feet in diameter, and a famous specimen in Marin County has a measured girth of twenty-three feet at the branching point of the tremendous stem, with many of the branches three feet through. The foliage is light and airy, the leaves oblong, pale beneath, bright green above. The bloom is in dense racemes of cream-white flowers; the fruit, a dry orange-colored berry, rough and uninteresting. But the charm of the madrona, outside of its general appearance, is in its bark—no, it is not a bark, it is a skin—delicate in texture, smooth, and as soft to the touch as the shoulders of an infant. In the strong sunlight of the summer these trees glisten with the rich color of polished cinnamon, and in the moist shadow of the springtime they are velvety in combination colors of old gold and sage green. There is a human pose to the trunk. Seen through the tangle of the thicket, it looks like the brown, lithe body of an Indian, and in the moonlight the graceful upsweep of its branches is like the careless lifting of a dusky maiden's arms. Every feature of the madrona is feminine. They grow in groves or neighborhoods and seldom stand in isolation, curtsy to the winds, mock at the dignified evergreens and oaks, and with every favorable breeze and opportunity flirt desperately with the mountain lilacs that toss high their purple plumes on the headwaters of Los Gota Creek.—Harper's Magazine.

THE total amount of timber cut on the National Forests in the fiscal year 1917 was 840,612,000 board feet, as against 714,505,000 board feet in 1916.

FRUIT AS FOOD TO WIN THE WAR

BY E. S. SMITH

WE must win the war against Germany; the food supply is the most important factor in that struggle and a great and untouched source of supply is more than a hundred million idle and unproducing fruit trees.

All the materials are at hand to make them productive. At little effort and small expense more than a billion extra bushels of fruit can be grown in 1918.

These five things should be done and wonderful results will be achieved:

(1) Measure the tree's diameter in inches, then go that distance in feet from it and dig a circular trench twenty inches in depth for drainage and the breaking up of the refractory sub-soil. Fill the bottom of the trench with old boards, sticks, brush, bones, old cans, straw, fodder or other refuse, and cover with earth.

(2) Carefully and thoroughly prune the tree of its water-sprouts and such other surplus growth so as to balance the top and permit the free circulation of air through the foliage and among the fruit. Be sure to remove all dead or badly broken branches and scrape the old, rough dry bark from the tree, for behind it insects may be hiding from the winter's cold.

(3) Spray the tree during winter or early spring with some material for the destruction of whatever scale may be lurking there to feed on the tree and its fruit. When bloom comes, give it another spray to destroy whatever moth eggs may be deposited in the bloom. When the bloom has fallen, give another spray to the small fruit so that all of it will grow to maturity and be of full size and wormless.

(4) Cover all the soil inside of the circle and about the tree with about a four inch depth of coarse manure, straw or fodder. Do this while the soil is frozen so that the early or premature thawing will be prevented, and cause the bloom to be later when danger of killing frosts will be past. The purpose of this mulch is to absolutely control the season of blooming. Permit all this mulch to remain and decay where you have placed it for the constant fertilization of the tree so it can keep up a steady growth and mature such fruit as sets on it.

(5) Scatter broadcast on the mulch mentioned in No. 4, from one-half to four pounds of Nitrate of Soda (Saltpeter), to each tree according to its size, so that this material may leach through the mulch during the winter and spring and go to the trench of loose earth for immediate fertilization to the feeder roots of the tree.

Where orchards or great rows of trees are to be treated, it will be advantageous to plow or dig trenches through the full length of the orchard mid-way between the rows of trees, and then between the rows in the other direction so as to give thorough drainage to the life-roots of all the trees, and to assure the fertilizer applied going direct to the roots for the immediate benefit of the tree and its fruit.

Every tree and orchard is entitled to this treatment annually, to give the maximum of production.

SHALL FORESTRY BE TAUGHT IN THE PUBLIC SCHOOLS?

BY J. W. TOUMEY

DIRECTOR OF THE YALE FOREST SCHOOL

THE PUBLIC schools have been much attached to the aphorism "science for science's sake." Nearly one-half of the labor of the world is in connection with the economic and commercial aspect of plants. They are the chief sources of the three great necessities of the human race, namely, food, clothing and shelter. A large percentage of the population on the earth is actively engaged in growing plants or in working their products into form for man's use and benefit.

Our public school students have been studying plants, for the most part, without relating them to the welfare and activities of mankind. They have been too much occupied in the study of plant as related to plant. They have been too little occupied with the economic and commercial aspect of plants, although of fundamental im-

Due to the rapidly increasing need for greater production of useful plants, both in agriculture and forestry, and for their improvement, interest is becoming more and more focused on not only the sciences dealing with plant production and utilization, but also upon the professions and vocations under whose practice they are produced and utilized. A school that confines all its training in plant life to the morphology and physiology of plants and the relationships between them and finds no time to train students in the actual production and utilization of useful plants is out of touch with modern progress. Vocational subjects must continue to receive more and more attention in our public schools together with the sciences which underlie their practice. Means must be found in the pursuit of them for the development of



A NATURE STUDY CLASS OF YOUNGSTERS IN THE SECOND GRADE

If a knowledge of forests and forestry is desirable—and we surely believe that it is—that knowledge must be cradled in our public schools, because it is here that the great body of our citizenship receives its intellectual training, and such classes as this afford opportunity for the observation and development of awakening vocational tendencies in the very young.

portance in the welfare of the race. Although students in our public and higher institutions of learning have studied plants from a philosophical rather than from a utilitarian point of view, in recent years more and more attention is given to plant production and utilization. The scientist devoted to his science for its own sake is slowly but surely giving way to the scientist devoted to his science for humanity's sake. Society has the right to demand of the student of plants that he render service which has a distinct and discernible economic value.

qualities and powers in the student at least equal to those found in the study of the older disciplines which they replace.

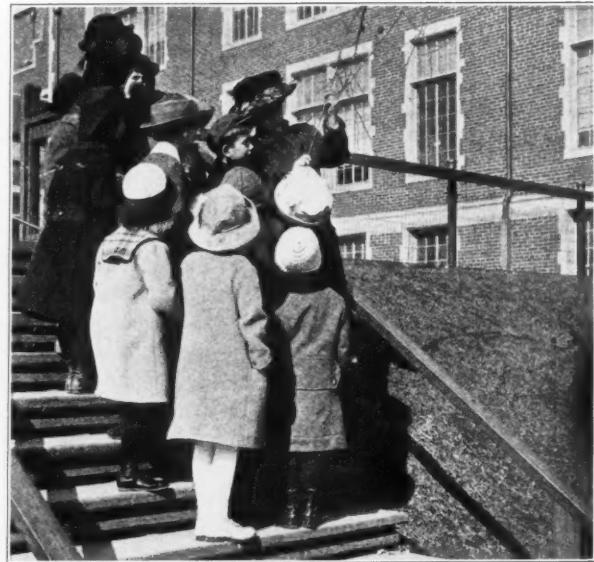
Society supports the public schools and expects them to train the youth and coming generations in ways that will enable them better to do the work of the world. *The duty of the schools is to supply both training and incentive for better doing.* Where the world has need for one professionally trained, it has need for hundreds of vocationally trained men and women. The public schools,

in every step from the primary grade to the university, have long over-emphasized intellectual equipment without regard for the power to do. Is it not time that the schools, without minimizing intellectual equipment, appreciate more fully that they are equipping their students for labor, for the power to do in the various arts, industries and professions?

A few years ago our engineering schools were content to teach engineering without the machine shop, but today the shop is the center around which engineering training rotates. The field and the woods are the "machine shops" where the theoretical knowledge of plants is put to crucial test, where the student learns how to make his knowledge effective, thus enabling him to become a better and more productive force in the world.

As a nation, we are rapidly moving forward in the introduction of agriculture into our public schools. This is particularly true in the agricultural states of the Middle West, where nature work centers around the school garden and where the rapidly increasing number of agricultural high schools, with their demonstration fields and gardens not only train their students in the production and utilization of farm crops but, what is equally important, give them a proper perspective and a sane view of agricultural pursuits.

I believe that the greatest service that the public schools can give the communities from which their students are drawn is to instill a wholesome respect for labor, *more particularly a respect for the kinds of labor that their students must later perform in their own communities.* It is wrong for any public school to train its



STUDYING TREE BUDS OUT OF DOORS

The natural interest and liking of these youngsters of the second grade for nature study work is wisely fostered by regular classes outside the school room.

students in paths that lead away from the industries upon which the community from which it draws its support depends for its prosperity and material progress. A public school education in an agricultural or forest community which ignores the field and the forest, which ignores the production and utilization of farm and forest crops, is fundamentally wrong. It does nothing to build up the community, but places a premium upon the migration of the more progressive sons and daughters to other regions.

Although 29 per cent of the total area of the United States is forest; although our forests supply annually about 100,000,000 cords of fuel wood and about 100,000,000,000 board feet of other classes of wood; although next to agriculture, our forests provide remunerative labor to more of our citizens than any other industry; although millions of dollars are annually wasted in forest fires and by unwise utilization, the pupils of our public schools receive at present little or no training in the production and utilization of this great resource.

The appreciation of the importance of forestry on the part of the public squarely rests with the public schools, because it is here that the great body of American citizens



INTERESTING FIELD WORK FOR THE BOYS

Students of the Agricultural High School at Sandy Springs, Maryland, measuring the height of a tree by the shadow method. They are learning something of the real meaning of the forest and its service to mankind, which knowledge may later incline them to study more deeply the science of agricultural or forestry pursuits.



receive their intellectual training and that their sympathies are aroused for the vocations and professions which later give them opportunities for usefulness, labor and prosperity. Public opinion of tomorrow has its roots in the secondary schools of today. The industrial development of tomorrow lies cradled in the public schools of today. What we as a nation will do and be tomorrow, what our thoughts and actions will be, is now being wrought by the public schools of the country into a great human foundation. The boys and girls of the country are the rough blocks of granite and marble that the primary and grammar schools are hewing into form that they may better fit into that great structure which we term "human society."

If a knowledge of forests and forestry is desirable, that knowledge must be cradled in our public schools. If it is to reach far enough and wide enough to profoundly influence the public opinion of tomorrow, it must be a part of the educational foundation of the multitudes in the public schools of today. If forest conservation is desirable, the meaning of the forest and its service to mankind must become a part

of the educational equipment provided by the public schools. Millions of children pass through the public schools, while only thousands complete the work of the higher institutions of learning. The public school is the great citizenship factory of the nation, where human intellects in the plastic state are molded and shaped for greater achievements.

If we accept the general proposition that forestry should be more extensively introduced into our public

schools, and especially in forested regions or where the forest provides the chief or important industries, you will ask, how can it be introduced and how much time should be given to it? The time should depend largely upon the location of the school and to what extent the pupils of the particular locality will in later life be identified with the production and utilization of forest products.

Although forestry should have a more or less prominent place in public school training, it is my belief that in the lower grades it can best be taught in connection with other subjects. In the primary grades, it should be taught as a part of *nature study*, as is already becoming the practice in some parts of the country. In the grammar grades, it should be taught in field excursions and in connection with courses in *geography*, *civil government* and *United States history*.

Field excursions conducted for students in the primary and grammar school grades can be made to provide superior intellectual discipline and cultivate a desirable attitude toward plant life in general, which later on inclines the

STUDY IN THE WOODS

These are Normal School students busily and happily engaged studying forest growth at their camp on the Potomac River, near Washington, D. C. This is a most essential phase of the work, for the proper

student toward the further study of plants and finally leads him to apply this knowledge in agricultural or forestry pursuits.

Field excursions for young students are most productive of results when classes do not exceed 10 or 15 students under a single instructor. The course should be definitely organized and as specific in the material used as a basis for the instruction as a course in the classroom. Field excursions without definite aim and un-



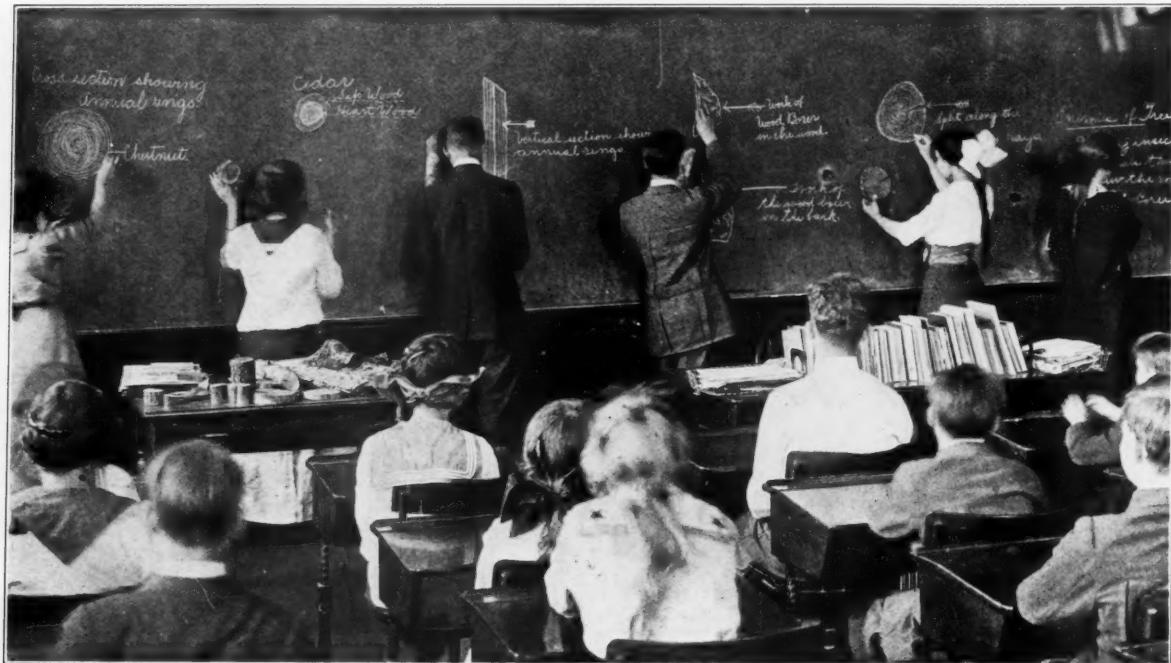
organized, without a definite amount of work of a particular character, are worse than useless.

Each excursion for the purpose of studying forestry should emphasize and illustrate one or more definite facts that relate to the forest. For instance, one excursion may be given to seed dispersal and the various forms of fruits and seeds that make it effective; another to germination and the conditions in the woods most favorable for it; another to growing space and the conditions under which the different kinds of trees grow best; another to the longevity of the different species; another to the enemies of the forest; another to the variations in the ability of different trees to endure shade; and so on through the various life processes and relationships that systematically lead the pupil to useful knowledge of the

almost entirely upon the personality and qualifications of the teacher. Field excursions as intellectual discipline can be made the most productive of results, or they can be made the most barren.

Not only should some forestry as well as some agriculture be taught as a part of nature study in the primary grades, but in the grammar grades it should be taught as a part of geography, civil government and United States history.

In recent years our text-books in the above subjects touch more and more upon the field of agriculture and forestry. We appreciate more keenly than at any previous time the influence of the forest upon the economic, social and political development of the country. As yet, however, a beginning has been made in placing forestry



BLACKBOARD WORK IN FOREST STUDY IN A WASHINGTON PUBLIC SCHOOL

These are pupils of the eighth grade, and enthusiastic students of tree life and the structure of wood. These classes first arouse the sympathies for vocations and professions which later give the opportunity for useful and profitable effort, and it is the duty of the schools to supply both vocational training of this nature and the incentive to do well.

forest. The student will soon see that each plant community has its own particular kind of soil, its own particular species, its particular forms of animal life, but within a unit of vegetation in which each living plant and animal is dependent in one way or another upon its associates. These excursions, if properly conducted, can be productive of the most serious reflection and thought on the part of the young pupil and of the highest value as a discipline in intellectual attainment.

The material for nature study afforded by the forest is almost unlimited. Its selection and method of use must be determined by the qualifications of the teacher. Its relative importance as an intellectual discipline, the usefulness of the knowledge acquired, and, most of all, its stimulation of the young mind toward a wholesome love for nature and the desire to know and to do, depend

where it ought to be in the public schools. Grammar school courses in geography should include a rather detailed account of the near-by forests, their kinds, distribution, economic value and principal products; also an account of the forests of the state, their area, ownership, relation to the industries of the state, their products and economic importance; and also an account of the forests of the United States, their ownership, forest regions, their economic importance in individual and social development, and their principal products.

In connection with courses in civil government, a study should be made of forestry in its relation to national and state governments, the use of land, absolute forest land, the necessity for forest removal, and how forests have influenced our industrial and political development. Lumbering should be considered as an industry, and its

movement, importance and method for its maintenance considered. In connection with courses in civil government should be taught the main outlines of national and state forest legislation, the land policy of the United States, the purpose, origin and growth of the national forests, and the general plan for their administration; also the state forest policy and the development of state forestry.

Of the great body of students who annually complete the work of the grammar grades only a relatively small number pass on into the high school or the industrial school. The greater number step from the grammar school directly into the realities of life where they immediately become the "hewers of wood and the drawers of water." It is this vast army of young American

also include a study of the effect of forests on soil and water, as well as on soil fertility and stability, and on stream flow and seepage; and a study of the effect of forests on public health, including their effect on potable water and the purity of the air.

In the manual training department of high schools or other schools of similar grade, the utilization and uses of forest products should be given far more attention than at present. In manual training in woodworking, a study should be made of the important woods in the industries and arts and the identification of the more important native and exotic species. Instruction should be given in the principal uses of wood and the substitutes for wood. The structural, physical and mechanical properties of wood should be studied, also the methods of



A CLASS OF SECOND YEAR STUDENTS AT THE WILSON NORMAL SCHOOL

The industrial development of tomorrow is rooted in the public schools of today, and that the influence of forestry and tree study work is gaining strength is unquestioned. General recognition of the advisability of establishing it firmly in the graded schools seems to be assured by the earnest attitude of these embryonic teachers.

blood that will form the voters of tomorrow and in whose keeping the forests of the country will chiefly rest. They can be reached only in the secondary school, and it is wrong when that training gives them no knowledge of the forest or its resources, particularly in those localities where from the nature of the region the forest must always remain the dominant resource from which the inhabitants secure a living and opportunity for labor.

To the small minority of students who continue their intellectual or industrial training beyond the grammar school the high school should offer opportunity for further instruction in forestry, but here also chiefly in connection with other courses. Courses in physical geography should include a study of the relation of forests to climate, their effect on atmospheric and soil humidity and on atmospheric and soil temperature. They should

seasoning and preserving so as to increase the durability and value of wood.

The manner in which forestry can be brought into the high school course in botany is exceedingly varied. Botany, aside from being a study of general culture, is important because of its intimate relation to agriculture and forestry. The forest is of first importance in the study of plant ecology. The forest provides the student of botany with his chief materials for studying the inter-relations of plants, the effect of shade, the limitation of growing space, the distribution of seed and germination.

Although it is my belief that forestry as a separate subject should not be introduced into our general high school courses, which are already over-crowded, I am convinced that it should be taught in connection with

other subjects from the primary grades through the high school. Public school training should prepare the student for greater efficiency and greater success in his later life. To lead the student along the road toward intellectual growth is not enough. We all concede that mathematics and languages are superior intellectual disciplines, but what folly it would be to provide the average public school student in rural and forest regions with these alone. The chief concern of the public schools should be to instill in the student respect for the vocations that the community affords and to impart knowledge that directly or indirectly relates to the vocation that he must later follow if he remains a part of the community. If the public schools do not impart such knowledge, the students on graduation are forced from necessity to migrate to other fields where they can find an occupation better fitted to their scholastic training. To my mind, our public schools are largely responsible for our over crowded cities and diminished rural population. This is largely due to their over-emphasis of intellectual disciplines without correlation with vocational pursuits and the almost complete ignoring of locality needs. They are, in reality, making many localities poorer and less progressive by draining them of their brightest and most efficient boys and girls, who, after leaving school are forced by the school system itself to migrate to other regions.

In many of our cities and larger towns, after the completion of the grammar school courses, trade schools afford opportunity for boys and girls to fit themselves to become skilled workers in various trades. To a lesser extent, agricultural high schools are coming into existence in the Middle West, fitting boys and girls for increased efficiency and greater success in agricultural pursuits. Although the forests of the country embrace 29 per cent of its total area we have as yet no forestry high schools where the boys who are later to labor in the woods may receive instruction which will make them more efficient in a vocation which may be the dominant one of their community.

Agriculture and forestry have close kinship. They both have to do with the production, harvesting and marketing of crops grown from the soil. They differ chiefly in the length of time required for the crop to mature. In most parts of the country the production of farm crops and the production of wood crops go along together under common ownership, as woodlots are still a part of almost every farm. For this reason, I believe that in most localities a part of the work of the agricultural high school should be given to forestry. This work should cover approximately twenty weeks and consist of the following two courses:

- (a) Introduction to forestry;
- (b) Farm forestry.

The purpose of the first course is to give the student a general knowledge of the subject and the importance of forestry in the economic development of the country. The latter course should be sufficiently comprehensive

to cover all phases of forestry that relate to the production and utilization of timber on the farm.

One of the most important distinctions between agricultural crops and farm crops lies in the profitable production of forest crops on soil too poor for successful agriculture. For this reason, great areas of the country, possibly 20 or 25 per cent of the total area, must remain forever in forest. Forest trade schools or ranger schools are as necessary in these regions as trade schools are in our cities. Such schools have long been established in the forest districts of Europe and should become a part of the public school system in the United States wherever the forest is the dominant resource and provides employment for a considerable percentage of the inhabitants.

Ranger school instruction must aim to teach the art, or trade, of forestry practice. The art, or trade, of forestry practice, as here used, includes all the operations incident to the ownership and utilization of timbered lands. Ranger school instruction should be localized and, so far as practicable, identified with the forest ownership in each locality. The place for ranger school instruction is in the woods. The character and method of instruction should vary with the local requirements which the student must be prepared to meet after the completion of his course. Therefore, a fixed standard for ranger schools is neither desirable nor necessary. The instructors in ranger schools should be professional foresters, so that the students may acquire a sympathetic understanding of forestry and breadth and view as to its scope and aims. The final test of the instructor's worth is expressed in his ability to equip his students for efficient work.

Unfortunately our educational system in forestry has been developed almost entirely around the demand for professionally trained men. Colleges and universities vie with each other in the establishment of schools and departments of forestry. We have sadly neglected the teaching of forestry in our public schools where the great body of our future citizens must find direction and incentive for productive labor.

SPHAGNUM MOSS FOR SURGICAL DRESSINGS

THE State Forester of New Jersey, Mr. Alfred Gaskill, is co-operating with the National Surgical Dressing Committee in providing sphagnum moss for the absorbent pads devised by Dr. Alexis Carrel.

The Committee has had considerable difficulty in securing moss of the proper quality, and the dressings thus far made have had certain faults due to a lack of uniformity in their absorbent power. The white cedar swamps of New Jersey contain an abundance of this material, and it is thought that by careful selection in gathering and on the drying beds a quality of moss can be provided that will meet the requirements.

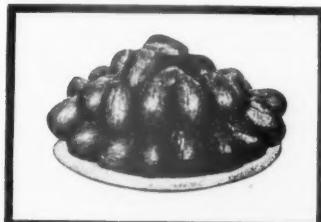
Thus is the knowledge of forestry once more made available to satisfy war needs.

PECAN PLANTING IN MEMPHIS

BY MARTA SCOTT CONSER

HAVING grown up where the sands of the prairie meet the woodland clay, and where land was valuable, I learned not only to love trees but to classify them according to their value. To the right was a luxuriant growth of hickory, walnut, sugar maple, besides the fine orchards. To the left was no natural growth of trees, but such a healthy growth of thrifty farmers with homes so beautifully set in backgrounds of towering orchards of nut and fruit trees that camera men loved to come along and take their pictures.

VARIETIES OF PECANS

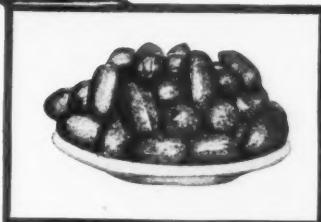


Bass Papershell.

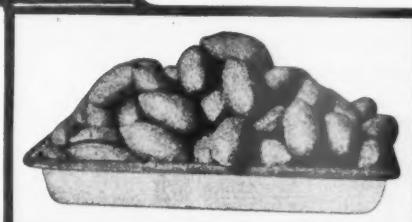
I pictured the grandeur of a view from one of our big trust buildings of spring-time green, of promising bloom, and delicious nuts, if only all of our trees were pecans—that nut candy, nut cakes, nut salad and nut bread might be plentiful as yellow yams. They began to listen and I was invited to speak in and out of the city.

I pointed out a relation between pecans and everything that makes for

Coming to Memphis I proceeded to talk about the pecan as the most beautiful, valuable, strongest-rooted and longest-lived tree of the South.



Stuart.



Van Deman

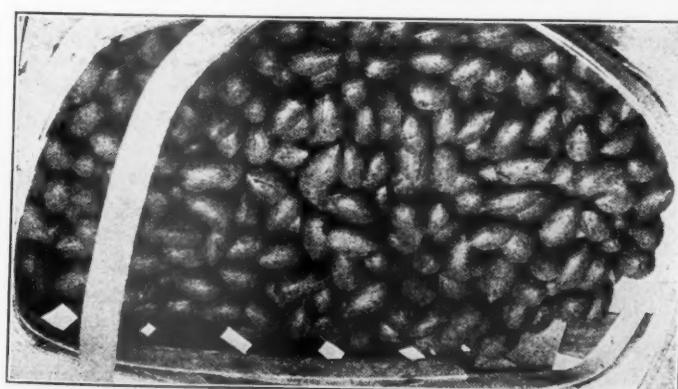


WHAT ONE TREE CAN PRODUCE

Crop of nuts from a bred-up pecan tree after having been set out for six years. The owner of this tree realized \$39 from the sale of the crop here pictured.

estimate of \$60 a tree, an annual income of \$8,870,000. Church workers were reminded that in the early Biblical times it was commanded of armies that they should lay not the ax at the trees of the cities besieged "for the trees are man's life."

Everybody was interested and kind, but I soon found that speeches planted no pecan trees. I appealed to the School Board, five good men a 11 university graduates, and of course, they agreed to co-operate. Dr. Kincannon, the superintendent,



PAPER SHELLLED PECANS

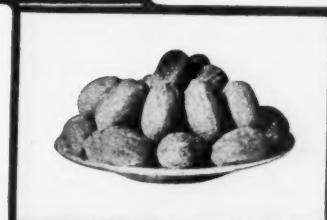
These nuts command a good price in the market and have high food value as well as delicious taste. The pecan tree is declared to be the most valuable and longest lived tree in the South.

had seen land values rise from seven dollars to two thousand dollars after a growth of pecans, and he

Frotcher's Eggshell



Success



was the greatest inspiration to the planting. Then I wrote four pecan songs and gave them to the schools, where the children were taught to sing them, for "Pecan Day" instead of just any-old-tree "Arbor Day." And while no grand opera star has sent in for a copy of the songs the plan worked successfully, for the children sang the pecan idea into the minds—and appetites—of Memphis.

The most prominent Memphis women verse writers made up a purse and bought pecan trees to be planted in



FINE CLUSTER OF BRED-UP PECANS

This shows the pecans as they grow in Memphis as the result of a determined campaign. Pecan growing is being urged as a means of profit and an improvement to the landscape.

memory of Judge Walter Malone and Howard Hawthorn McGee, two local poets who had died. The program dedicating the trees to the city was carried out in Forrest Park. Dr. A. A. Kincannon, Bishop Gailor, Rev. Dr. Ben Cox, Robert Beatty and others delivered eloquent addresses, and more than fifteen hundred children sang the pecan songs.

This attracted the attention of prominent people and checks of three dollars began to come to me for trees to be planted in honor or memory of honorable citizens, and now it appears that it will not be long until everybody worth while in Shelby county will have a pecan tree bearing his name and sending it higher and higher for centuries. And after many generations shall have passed Memphisans will show the stately trees to

visitors and proudly claim that the trees were planted by their ancestors. In half a century old ladies and gentlemen will love these trees with great tenderness and tell



AN ADVOCATE OF PECAN PLANTING

When Mrs. Marta Scott Conser moved to Memphis from a wooded region she advocated the planting of pecan trees for beauty and utility. The co-operation of the school board was secured and much progress has been achieved.

their grandchildren of the planting. A thousand dollars is offered for any pecan tree that has died or ceased bearing from old age. So beautiful and everlasting a monument could never be had from the work of any man.

A history of each tree is kept. All letters are kept on file, also all newspaper clippings, and these will be put into shape and turned over to the city. For there is no question that Memphis will some day be famous for the wonderful beauty and wealth of her pecan trees.

A DISEASE OF THE HEMLOCK TREE

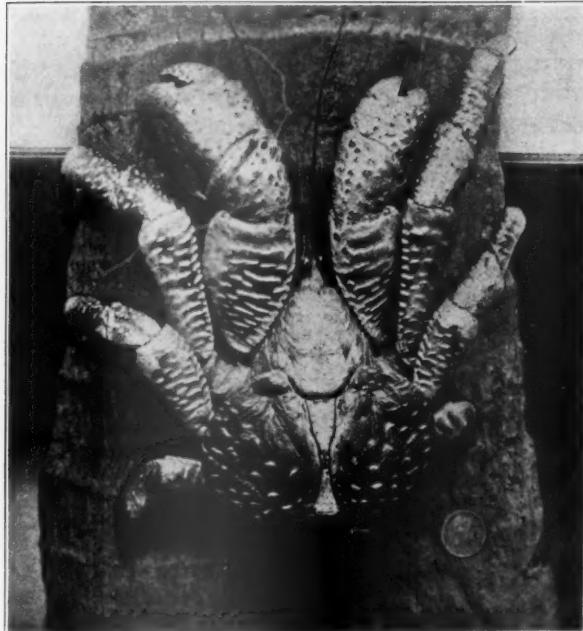
A disease of the hemlock tree due to a woody, poroid fungus, *Fomitiporia tsugina* Murrill, was discovered by Mr. Percy Wilson at East Hebron, New Hampshire, in August, 1905, reports W. A. Murrill, assistant director of the New York Botanical Garden.

In July, 1917, Mr. Wilson revisited the type locality and gathered specimens from the trunk of the same tree, which was found to be dead and prostrate on the ground. These later specimens were over an inch thick and broadly effused over the trunk. Living hemlocks recently examined by Mr. Wilson near Bristol, New Hampshire, were also found to be attacked by this fungus, which is known to occur in New Hampshire and New York, always confined to the hemlock. The disease is probably important and should be further investigated both by foresters and mycologists.

TREE CLIMBING CRAB

BY H. A. ZIMMERMAN

THE robber, or cocoanut crab, has been known for some centuries but until lately doubts have existed whether these crustaceans actually climb trees to reach the cocoanut. The picture shown here, taken on Christmas Island, should do away with all uncertainty on this point. The appearance of these giant creatures crawling through the woods makes one feel decidedly creepy. The animals are easily frightened, and scuttle off backwards at the slightest alarm. They live not only on cocoanuts, but feed on fruits of various kinds, especially those of the sago-palm, while carrion of all sorts—even the bodies of their own relatives—do not come amiss. At one time, when rats swarmed in the forest at night, the crabs restricted their depredations to the daylight hours; but now that rats have disappeared, even at night, camp utensils are not safe from their claws. In fact, they



THE ROBBER CRAB

Horrible to look at—and with worse habits—for he is a "thief in the night."

have been known to carry away cooking utensils, bottles and clothes. The robber crab's method of carrying cocoanuts is to strip them of their husks and then to hold the nut under some of its walking legs, while it retires, raised high on the tips of those legs not used for this purpose. Darwin has graphically described how it tears the husk from the cocoanuts and hammers on the round depressions at one end until entrance is effected.

This crab lives in a hole in the earth under trees, lining its burrow with the fibers of the cocoanut husks. It has an almost lung-like modification of the gill cavity for breathing air directly, yet visits the sea annually in droves to spawn. In climbing this crab scarcely uses its large claws, but clings to the tree with the sharp points of its walking legs. It can also climb almost vertical rock faces.

A DOUBLE HICKORY NUT

BY ROBERT SPARKS WALKER

TWO nuts in one shell is a very rare occurrence with the hickory nut family. But why should not there be such a variety? The chestnut would be less attractive if not less productive were it not for the fact that the prickly burr economizes in housing two, three and sometimes more nuts. Suppose that each single chestnut had an individual burr. This would draw heavily upon the vigor of the tree, and in all probability would result in a smaller nut than those multi-producing burrs.

So far as known, the only hickory tree producing double nuts is found growing in the extreme southeastern part of the state of Tennessee. From close observation covering a period of four years, it appears that only a



THE TREE, AND THE NUT

So far as is now known, this is the only hickory tree in this country producing double hickory nuts.

portion of the branches producing fruit buds are mutating. Mutating is simply a process of changing styles in the vegetable kingdom. From a third to one-half of the branches produce double nuts, and these are isolated in a position we will call on the west side of the tree. These, however, never have failed to produce the double nuts, as shown in the photograph. The specimens are all alike, excepting on some branches located on the east side of the tree, which appear to be in the process of "doubling up."

FORESTRY NOTES AND COMMENTS

THE construction of wooden ships has caused such a heavy demand for locust tree-nails that the price has jumped to considerably beyond the normal figure. One of the consequences of this has been widely varying prices asked for suitable locust stumps, with a marked upward tendency. The Forest Service is selling locust stumps from the Pisgah Forest, for some of which very high prices have been bid. Prior to the development of the demand for tree-nails locust posts were being sold at 5 cents apiece. Tree-nail material is ordinarily sold by the cord, and the equivalent of 5 cents apiece for posts would be about \$5 a cord. The class of material required for tree-nails, however, is much higher. After careful consideration of all the factors the Forest Service has reached the conclusion that a stumps charge for locust suitable for tree-nails varying from \$5 to \$15 a cord, according to the accessibility and other determining factors, is justified. On the Pisgah Forest recent sales have been made at \$7 per cord.

MONEY has been subscribed by members of the Washington office for a service flag to show for the entire United States Forest Service the number of men who have gone into the Army and Navy. The dimensions of the flag are 6 by 10 feet; it will have 255 stars, with room for additions. The presence of the flag on the front of the Atlantic Building will serve to remind the people of Washington that the Forest Service is doing its share in the military branches as well as in the investigative work relating to war problems.

A LETTER and telegram received by the Forest Service in one day from District 5 described an alarming outlook and furnished a happy ending, for the drought situation in California. At the time the letter was written no rain had fallen in southern California, and very little over the rest of the State. Losses of stock were already severe and promised to become sweeping. A few bits of feed had been opened up to the Santa Barbara Forest, but beyond this the Service was powerless to help. The telegram, however, which was sent five days after the letter, reported that, beginning the day after the letter had been mailed, a general rain had fallen throughout the State.

THAT the war farming propaganda of last spring met with a response from the farmers of at least one State, which was related in a novel way with the working of the Weeks law, is shown by the report of the State Forester of Kentucky on fire co-operation for 1917. According to the report, there was an unprecedented number of fires in Kentucky last spring caused by farmers burning brush while clearing land for cultivation. Over half the forest fires reported in the State last year, the State Forester says, were from this cause alone.

FIFTY species of South American woods are now undergoing tests at the Forest Products laboratory. They constitute probably the first large group of tropical woods to be tested in this country for commercial purposes. The question of primary interest in the present investigation, is the war value of each of the woods, but data gathered may point to the advisability of permanently correlating these species with the commercial timbers of the United States. Many of them exist in enormous quantities, and can be cheaply exported; and with a knowledge of their characteristics it should be possible for us to use them to replace some of our scarcer native woods. Through the installation of a hydraulic press in the section of preservation, the laboratory is enabled to manufacture its own veneer panels for testing purposes. This new equipment will greatly facilitate the study of veneer airplane parts and of waterproof glues.

THE Saginaw & Manistee Lumber Company has executed a contract for the purchase of the remaining timber on the Kendrick Park and Kendrick Mountain units within the Tusayan and Coconino National Forests, thus concluding negotiations begun in 1915. The Company had previously purchased in small sales some timber within these units, but delayed taking all, on the ground that it could not do so until Congress passed the bill extending the time within which the timber rights could be exercised on a large number of odd-numbered sections within the same Forest. The Department of Agriculture has reported favorably upon this bill and there is good prospect that it will pass. Meanwhile, the new sale involving some 40,000,000 feet, will enable the Company to operate with logical extensions of its present railroad system.

OVER 1,000 pounds of western white pine seed were extracted last year on the Kaniksu National Forest at an approximate cost of \$3.75 per pound. The high cost was accounted for by the fact that the dry weather opened up cones on the trees, so that nine-tenths of the seed was lost before the cones could be gathered. The survey crew, under G. W. Jones, covered during the season 14,105 acres of intensive topographic surveying, and 169,495 acres under extensive survey on the Coeur d'Alene, Pend Oreille, and St. Joe Forests.

A NUMBER of men formerly engaged in Acquisition work in the United States Forest Service are now in the army. E. L. Lindsey is in France as first lieutenant in the Tenth Engineers and is in command of the first detachment of that regiment. H. L. Cooper, a former transitman, is a second lieutenant at the Camp Lee Training School; J. F. Quisenberry is a first lieutenant in the Engineer Corps; W. A. Mattoon is at Camp Slocum; while C. H. Burrage and John H. Keener are in the Twentieth Engineers (Forest).

DURING last summer Forest Ranger James C. Friend, whose district is north of the Yellowstone Park, killed ten bears and caught two cubs alive. Bears had been unusually active in raids on sheep and had killed about 400. Several of the herders were badly scared and one was treed for a considerable time. About the middle of the summer, Ranger Friend returned to one of his headquarters' cabins after an absence of several days and found that it had been badly wrecked by bears, which had gained entrance through one of the windows. Everything in the cabin was torn up and pawed over; even the cooking stove had received its share of abuse. Shortly after this time, five bears, three of which were silver-tips, paid a return call to the cabin and the hides of three of them were, at last accounts, drying on the barn.

THE greatest fire losses in District 4 of the United States Forest Service, in 1917, occurred in the zone which includes the Salmon, Challis, Boise, Weiser, Payette, and Idaho Forests. Throughout this region, practically no rain fell from about June 10 to September 11. The grasses, weeds, and duff became extremely dry and very susceptible to rapid spread of fire. In the middle of August there were several thunderstorms and the lightning caused numerous fires at places which were very difficult to reach. On the Payette Forest, 61 fires occurred during August and 36 of these were during August 16, 17, and 18. Nearly every one of these, it is thought was started by lightning. During these same days, there were five large fires on the Idaho Forest that called for an expenditure of approximately \$50,000.

AN extensive land classification for the Alaska forests is being planned for the coming spring. Very little of the twenty million acres of National Forest land in Alaska has been classified thus far. It is expected that a good many special problems will arise. Among these are the large Muskeg areas. In some places vegetables are raised on decaying matter found to a depth of a few feet, with no soil underneath. Extensive classification will separate possible agricultural areas and will be the first step in the application of land classification principles in that region.

AMAMMOTH two-ton Christmas tree, felled on the Pike Forest and delivered by auto trucks a distance of 40 miles under the supervision of Denver forest officers, was erected on the civic center and formed the pivot about which the populace of Denver gathered on Christmas eve to join in the singing of carols and to herald the arrival of Santa Claus.

FOR some time District 6 of the United States Forest Service has been encouraging the cattlemen using National Forest ranges to carry small bunches of sheep on their ranches for the purpose of cleaning up odd corners, and stimulating the production of mutton and wool. The plan is being largely adopted and the cattlemen insist the sheep are a great asset in every way.

A DEPARTMENT recently established at the Forest Products Laboratory is the section of lumbering. Its activities are directed by Henry J. Hegel, who returned to the Forest Service from the General Electric Company. By collecting important data relating to the lumber manufacturing industry, the department expects to offer practical assistance to the manufacturers in solving various commercial problems.

A CENSUS of the lumber production of the country during 1917 is to be made by the Forest Service in co-operation with the National Lumber Manufacturers' Association, as in past years. Questionnaires have already been mailed to the 30,000 sawmills throughout the country asking that the amount of each kind of lumber cut be reported promptly.

STUDY of the utilization of various waste barks, for the manufacture of pulp and paper products, has been made by the Forest Products Laboratory. Tests under the sulphate process for making paper have been followed up and a good quality of kraft pulp, suitable for a high-grade wrapping paper, was obtained from each of 13 species.

THE war service records of the New York State College of Forestry at Syracuse University show 90 undergraduates, 48 alumni and 5 members of the faculty with the colors. Dean Hugh P. Baker is a captain of infantry in the regular army, and Prof. Reuben P. Pritchard is a first lieutenant in field artillery.

THE Legislative Assembly of Porto Rico recently passed a comprehensive law, providing for an insular forest service, experiment station, and public forests in charge of a technically trained forester. The law was drafted by the office of state co-operation of the United States Forest Service, and the action of the Legislative Assembly is the result of an examination of and report on forest conditions in Porto Rico made by the office of state co-operation several years ago.

ACCORDING to one of the German forestry journals, the Kaiser, in 1908, killed 1,995 pieces of wild game, including 70 stags, elk and roebuck. At that time he had slaughtered a total of 61,730 pieces of game, more than 4,000 of which were stags, and was the leading exterminator of wild life in the world. As a slaughterer of men, women and children since 1914, however, he has been the foremost exterminator of human life in all history.

STUDIES at the Forest Products Laboratory, at Madison, Wis., have shown that Engelmann spruce treated by the sulphite process gives a pulp that compares very favorably in color and strength with that of white spruce.

NEARLY half a million people use the Pike National Forest, in Colorado, each year for recreation.

AMERICAN FORESTERS IN MILITARY SERVICE

This list is compiled from various sources. Every effort has been made to make it complete and accurate, but in the nature of things there are necessarily omissions and errors. The list will be reprinted and increased from month to month. All foresters and others who can supply additional names or note corrections are urged to communicate with American Forestry as promptly as possible, to the end that the list may have full value as a record of the men who have gone to war.

A GEE, Fred B., 1st Lt., Engr. Corps (For.); deputy forest supervisor, U. S. F. S. Albano, Jack, forest ranger, U. S. F. S. Adams, George (Ohio State Univ.), 10th Eng. (For.). Alduin, E. E. (Mich. Ag. Col., '15). Aldous, Tura M., grazing, U. S. F. S. Aldsworth, Donald (Univ. of Minn., '14), Off. Tr. Camp, Presidio, Cal., San Diego, Cal. Alexander, Ben. (Bilt. For. School), 2nd R. O. T. C. Alexander, J. B., 1st Lt. Aviation Corps (Univ. of Wash., '17). Allen, Raymond, New Jersey. Ames, F. E. (Yale For. School, '06), Capt. Anderson, A. C., 2nd Lt. U. S. A., Ft. Leavenworth, Kan. (Univ. of Wash., '17). Archer, Frank, Engr. Headquarters, France, forest clerk, U. S. F. S. Armstrong, Carroll W. (Bilt. For. School), Quartermaster's Dept., Fort Dodge. Armstrong, Ralph H. (Bilt. For. School), 104th Inf., Expeditionary Forces, France. Atkinson, E. S. (Yale For. School, '16, and Biltmore), 2d Lt., Ft. Grant, Canal Zone. Atwood, C. R. (Univ. of Maine, '15), manager, Unit I, New England Sawmill Units. Avery, B. F. (Yale For. School); Spanish River Pulp and Paper Mills. Aylward, F. N. (Univ. of Calif.), Amb. Corps.

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Hall, R. C. (Yale For. School, '08), forest examiner, U. S. F. S.; assigned to timber reconnoisseur in France.

Hall, Stanley B. (Harvard, '09).

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Hammond, Charles P. (Biltmore), 20th Engineers (Forest).

Hansen, Harvey L. (Univ. of Calif.), Amb. Corps.

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Harding, Charles C. (Yale For. School, '16).

Harracher, Josef (Mt. Alto, '17), 20th Eng. (For. est.), 1st Bat., Pa. Dept. For.

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Harley, William P. (Amer. Forest School), 10th Eng. (Forest).

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Harrison, Donald (Univ. of Mont.), 10th Eng. (For.).

Hardman, J. O., 10th Eng. (For.), A. E. F., France, U. S. F. S.

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Heaworth, Robert (Univ. of Minn., '13).

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Hendrix, Albert W., forest ranger, U. S. F. S.

Henry, D. D., 2nd Lt. (Mich. Ag. Col., '15).

Hennwood, C. H. (Penn. State, '14), National Army.

Hertrick, R. E. (Mich. Ag. Col.), Forestry Dept., U. S. F. S.

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Holdsworth, R. P., Capt. (Mich. Ag. Col., '11).

Holman, Thomas (Ohio State Univ., '17), 20th Eng. (For.), American Univ., Wash., D. C.

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Holt, Felix R. (Yale For. School, '02).

Honeycutt, E. E., 20th Engineers (Forest).

Hope, L. S. (Yale For. School, '16).

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Hough, R. J. (Ohio State Univ., '15), Inf., Ft. Huachuca, H. H. Co. B, 10th Eng. (For.), A. E. F., France.

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Hugo, P. (Penn. State, '19), National Army.

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Humphrey, J. C. H. (Yale For. School, '09).

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AMERICAN FORESTRY

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JANOUCH, Karl L. 20th Eng. (For.), Am. Exped. Forces (Univ. of Nebr., '17).
 Jeffrey, Walter (Cornell, '18), Ensign in the Navy, Battleship "Missouri."
 Jenson, A. F. U. S. F. S.
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 Johnson, Ansel R. H. (Baltimore), Naval Aviation section.
 Johnson, Joseph H., asst. forest ranger, U. S. F. S.
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 Johnson, Oscar S. (Univ. of Minn., '10), 10th Eng. (Forest), U. S. F. S.
 Johnson, R. J. (Mich. Ag. Col., '10).
 Johnson, W. R. (Mich. Ag. Col., '12).
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 Kelley, Capt. Arthur L. (Colo. Agr. Col.), 19th Co., Inf., O. R. C.
 Kelly, Evan W., Capt., 10th Eng. (For.), forest examiner, U. S. F. S.
 Kelley, Gordon L. (Macalaster College, Minn.), 10th Eng. (For.), A. E. F., France.
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 Kilbourne, E. I. (Cornell, '17).
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 Kobbe, William H. (Yale For. School, '04).
 Koch, Eiers (Yale, '03).
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 Livingston, R. (Penn. State, '19), 10th Eng. (For.).
 Lockwood, Milton K. (Baltimore), 1st Lt., School of Military Aeronautics, Austin, Tex.
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 Long, Edward (N. H. State Col., '17), U. S. F. S.
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 Loveman, A. M. (Yale For. School, '16).
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 Lyman, R. R. (Penn. State, '18), 10th Eng. (For.).
 Lyon, A. C. (Mich. Ag. Col.).

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 Maloy, Thomas P., 20th Eng. (Forest), Co. B., 5th Bn., U. S. F. S.
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 Marsh, A. Fletcher (Yale For. School, '11).
 Marston, Charles O. (Baltimore), 10th Engineers (Forest).
 Marston, Capt. Roy L. (Yale), 103rd U. S. Inf., Co. E., France.
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 McCutcheon, T. D. (Penn. State, '20), 20th Eng. (For.).
 MacDaniels, E. H. (Yale, '09), 20th Eng. (For.).
 McDougall, Edmond H. (Univ. of Wash., '17).
 McDonald, W. A., Capt. (Mich. Ag. Col., '13).
 McDowell, Willard, U. S. F. S.
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 McPherson, Benj. D. (Mt. Alto For. Acad., '16), 10th Eng. (Forest), Pa. Dept. For.
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 Meyer, Leo W. (Yale For. School, '17).
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 Moore, Barrington, Capt. (Yale For. School, '08), U. S. F. S., France.
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 Myers, Reynolds V. (Baltimore), senior non. com., 10th Eng. (Forest).

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 Naramore, David C. (Baltimore), 20th Engineers (Forest).
 Neigle, William (Yale, '04), 20th Eng. (For.).
 Nelson, Enoch W., grazing assistant, U. S. F. S.
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 Nelson, Oscar Leo, 20th Eng. (For.), U. S. F. S.
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 Oles, W. S., 20th Eng. (Forest), (Cornell, '16).
 Oliver, J. Earl, 10th Eng. (For.), forest ranger, U. S. F. S.
 Olson, O. A. (Mich. Ag. College, '16).

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Men not subject to draft may enlist at any United States Recruiting Station. Men subject to draft may apply to their local boards, or application may be made through Major C. E. Clark, office of the Chief of Engineers, Room 25, War Department, Washington, D. C.

WIRE, WRITE OR MAIL THIS COUPON. Telegraph, write or fill out the form printed below, and address it to Major C. E. Clark, Office of the Chief of Engineers, Room 25, War Department, Washington, D. C.

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3. Age.....	4. Nationality.....
6. Have you been called in draft?	7. Will you enlist for the period of the war?
8. State briefly your working experience.....	
9. What machinery can you operate?	
10. Your present or former employer must certify to your qualifications by signing here.....	

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AMERICAN FORESTRY

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Parker, Roscoe S., Capt., 10th Cav., Ft. Huachuca, Arizona.

Parker, T. W., American Lake, Washington.

Partridge, Herbert E. (Biltmore).

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Plummer, Donald (Univ. of Wash., '20).

Port, Harold F. (Mt. Alto For. Acad., '16), Co. A, 10th Eng. (Forest), France, Pa. Dept. For.

Porter, O. M. (Yale For. School, '15), Lt. 10th Eng. (For.), A. E. F., France.

Porter, Harry C., Co. K, 361st Inf., Camp Lewis, Tacoma, Wash.

Powell, Harry A., British Army (Univ. of Wash.).

Powers, James E. (Mt. Alto, '15), Artillery, Pa. Dept. For.

Rowers, Victor S. (Univ. of Wash., '16). Battery A, Wash. Sig. Corps.

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QUINLAN, James, woodsman, Ten Saw Mill Units (Mass. Forestry Dept.).

RAINSFORD, W. K. (Yale For. School, '06).

Ramsdell, Williett F., Sgt., 10th Eng. (For.), Co. B, A. E. F., France, deputy forest supervisor, U. S. F. S.

Raine, Burton D. (Ohio State Univ., '17), Av. Rase, Frederick W., Capt., 8th Co., 364th Suf., Camp Lewis, American Lake, Wash., surveyor, U. S. F. S.

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Reid, Thomas P. (Yale, '11), Co. F, 6th Bn., 20th Eng. (For.), Am. Exped. Forces.

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Rees, H. S. (Univ. of Wash., '14), Canadian Contingent, killed in battle in France.

Rees, L. A. (Univ. of Wash., '14), Canadian Contingent, killed in battle in France.

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Rowland, Howard B., Jr. (Mt. Alto For. Acad., '15), Co. F, 10th Eng. (Forest), France, Pa. Dept. For.

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Russell, William J., 20th Engineers, forest ranger, U. S. F. S.

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Schmitz, Henry (Univ. of Wash., '15), 1st Class Machinist, U. S. Naval Reserves.

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Schubert, B. L. (Penn. State College), Forestry Dept., '15), U. S. F. S.

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Severance, H. M. (Univ. of Cal., '10), Pa. Dept. For.

Shaefer, Oscar F., 10th Engineers (Forest) Am. Exped. Forces, France.

Shank, Philip (Univ. of Wash., '20), Coast Art.

Sharp, Milton K. (Univ. of Ohio, '16), Bat. A, 134th Field Art., Montgomery, Ala., killed December 5, 1917.

Sharron, John L., Ten Saw Mill Units, Mass. For. Dept.

Shaw, Ezra I., Marines, Mare Island, Calif.

Shawhan, H. W. (Biltmore), 1st Lt., Ft. Caswell, Cape Fear, N. C.

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Simons, S. T., 25th Eng., Camp Devens, Ayer, Mass., U. S. F. S.

Simpson, C. E. (Penn. State Col., '16), 10th Eng. (For.), died in Scotland October 3, 1917.

Simpson, R. A. (Penn. State Col., '18), Amb. Corps.

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Taylor, N. E., 10th Eng. (For.), A. E. F., France.

Texter, A. F. (Penn. State Col., '21), 20th Eng. (Forest).

Thayer, Ralph, 20th Eng. (For.).

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Thomas, Harry L., Co. C, 10th Eng. (Forest), forest ranger, Pa. Dept. For.

Thomas, John, 10th Eng. (Forest), France, forest ranger, Pa. Dept. For.

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Wyman, Hiram (Univ. of Minn., '15), 10th U. S. Eng. (For.), A. E. F., France.

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YEMANS, E. J. (Yale For. School, '12), forest ranger, U. S. F. S.

Young, Douglas E., private English army, killed in France April 10, 1917 (state forest warden, Maryland).

Young, James E., 20th Eng. (For.), forest guard, U. S. F. S.

Young, L. F., 2nd Lt. Inf. (Univ. of Wash., '17).

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Zahn, George D. (Univ. of Wash., '20), Coast Art. Corps.

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DONATIONS TO THE WELFARE FUND FOR LUMBERMEN AND FORESTERS IN WAR SERVICE

AMERICAN FORESTRY will publish each month the list of those making donations to this fund. Many of the donations from members of the American Forestry Association so far received were made without solicitation and were inspired by reading in the magazine that relief and comfort fund for the men of the forest regiments was to be started. Many substantial contributions are being received from lumber companies and lumbermen following requests sent to them by the Secretary of the Welfare Fund for Lumbermen and Foresters in War Service, by the lumber organizations of which they are members, and by the committees of lumbermen which had charge in various sections of the United States of securing enlistments for the forest regiments.

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CITY FORESTERS WANTED

TWO more cities have recently taken action to secure City Foresters. These are Milwaukee and Racine, Wisconsin. The work in both cases is to be under the Board of Park Commissioners, and men with the necessary technical training and practical experience are wanted. Executive ability and a high degree of tact and firmness are also regarded as necessary qualities in order to handle the work efficiently and to secure the co-operation of the general public. Foresters desiring to apply for the position should write directly to the Board of Park Commissioners in the city concerned.

AIRPLANES for game protectors may become the latest thing in wild life conservation. Already Llewellyn Legge, Chief of the New York State Division of Fish and Game of the Conservation Commission, is up in the air over reports that men who have failed to make the aviation corps are relieving their feelings by looping-the-loop and side-slipping in pursuit of wild ducks, letting loose rounds of machine gun fire at each slip. "It is against the Conservation Law," said Chief Legge, "to take waterfowl in any other way than from the land, from a blind or float, or from a rowboat within fifty feet of shore or a natural growth of flags. If we have to stop that work, we will ask for airplanes to do it, and I know that we have protectors who can fly high enough to catch their man."

THE Minnesota state forestry department is placed in charge of scaling and measuring timber cut from state lands, under order No. 21 of the Minnesota Public Safety commission, adopted in January. Fees are fixed and are to be paid into the surveyor general's funds, from which expenses will be paid.

CANADIAN DEPARTMENT

BY ELLWOOD WILSON

SECRETARY, CANADIAN SOCIETY OF FOREST ENGINEERS

The week of February 4 to 9 will be a field week for forestry in Canada. On the fifth, the Canadian Lumbermen's Association will hold its annual meeting, on the sixth, the Canadian Forestry Association and the Canadian Society of Forest Engineers, on the morning of the seventh there will be a conference to discuss the substitution of wood for coal during the shortage and the business meetings of the forest protective associations of Quebec and in the afternoon the first meeting of the newly formed Woodlands Section of the Canadian Pulp and Paper Association. The eighth there will be a general forestry conference on fire and other kinds of protection at which experts on different lines will speak and discussions will be held. All who are interested in the various phases of forestry work are cordially invited to be present.

The Hon. Richard Turner, President of the Quebec Forest Protective Association, died the week before Christmas and his loss will be keenly felt. He was an enthusiastic advocate of good fire protection and took a deep interest in the work.

Several meetings of the Quebec Forest Protective Association were held during the past month to discuss the closer federation and better organization of the four protective associations of the Province and the improvement of fire fighting methods. It is hoped during the coming season to introduce many improvements and make the associations much more efficient. There are still a few limit holders, who through false economy or selfishness still continue a menace to their neighbors through inadequate protection of their lands. One large firm in particular is the worst offender, together with certain American concerns, and it is hoped that they will abandon their selfish and unpublic-spirited attitude before the coming season opens.

The interest in forestry in general in Canada continues to grow. During the last month the St. James Literary Society of Montreal had a forestry evening and the Canadian Forestry Association gave an illustrated lecture on banking in its relations to forestry before the Canadian Banker's Association in Montreal and it is planned to hold such meetings in other cities.

Professor Chandler, of Cornell University, made a trip to Grand Mere, to look

over the operations of the Forestry Division of the Laurentide Company and to advise about improvements in cost keeping methods.

Mr. Clyde Leavitt, Forester to the Dominion Railways Commission, has abandoned his annual trip to the West to take charge of studies on the best way to encourage the use of wood to replace coal and methods of obtaining an adequate supply. Prices of wood are very high this winter owing to shortage of labor and the long hauls necessary. When farmers, who have no work for themselves and their teams during the winter, go out and cut a few loads of wood to sell in the nearest town they can do so quite cheaply, but if anyone attempts at the present time to cut cord-wood either by the cord or by day labor, it is practically impossible to do it for the same price as charged by the farmer. The question of the fuel shortage brings into prominence the necessity of educating the farmers as to the necessity of caring properly for their woodlots and keeping them stocked. In the Province of Quebec and generally throughout Canada, the settlers have cleared their lots too much, without keeping the rougher portions wooded, and have also allowed the fires to run over the rougher slopes, burning off the soil and making it impossible to re-establish forest growth. The result is that in a country preeminently fitted for the growth of timber, fire wood is growing somewhat scarce and the prices are continually rising owing to the long hauls which are necessary. Then too, there are large quantities of wood of inferior quality which should be cut to make way for more valuable species and which could well be sold for a lower price but which people in general will not use, demanding always the very best quality, leaving the other to rot on the ground. There is no question that for the proper management of our forests and woodlots the public must be educated to pay higher prices for all wood products; for better management, management which is urgently demanded by the public interest, costs more money than the old methods and owners cannot be expected to undertake it unless with the co-operation of the general public.

An interesting extract from a letter from Sergeant S. H. Clark:

"I am attached to a Forestry Draft, though I think it rather incorrectly named. We are located close to the firing line

where the "whiz-bangs" are conspicuous almost continually. Our work seems to be to finish clearing up a hardwood forest which was recently operated by the Huns."

In Alberta, under Mr. E. H. Finlayson, during the past season, the fire season was bad during the latter part of September. The season on the whole was a dangerous one, the two most serious fires being the McLaren fire on the Crow, and the Solomon fire on the Athabasca. The former covered an area of 1,598 acres of which 913 acres was merchantable, 181 acres cut-over land, 504 acres unmerchantable timber. The total timber burnt is estimated at 7,160,000 board feet.

A letter from Mr. Dickson, of the Dominion Forest Service, now at the front, says: "After training all summer on the guns, siege artillery, I was lately transferred to this corps at the request of the General in charge. Have been here for less than a week, at the Forestry Corps headquarters, getting wise to the ropes, their methods of estimating timber and the amount of silviculture, if any, that is practiced in the operations under way, both here in Britain and in France. Altogether we may have before long 20,000 men at work, and you can imagine what such a mob of well-supervised lumber jacks are turning out a few cubic feet of lumber and pit props every month. It is tremendous the amount of material required at the front for constructing bridges and corduroy gun-pits and emplacements, military railways, hospital stations and huts, and in the endless reaches and ramifications of trenches. Do you know that they haven't even gotten a basis establishment yet for forestry in this old 'Old Country' (England). That is to say, there seems never to have been any systematic land classification attempted. There is a great deal of timber growing on the land which will more profitably grow food crops, and there are large areas on which farming is being attempted, or at least pasturing, which is absolute forest land. At present our skilled Canadian woodsmen are only employed in the actual cutting and conversion of the timber taken over by the Corps, and the final cleaning up of the fuel wood and slash is left to be done as a secondary operation by the relatively inefficient labor of Portuguese, or of Hun prisoners, or of 'Couchys,' men whose time has a value which is somewhat reminiscent of the story of Jim Hill's hogs."

The Forestry Companies in France have greatly impressed the French with their speed and efficiency, though their methods are careless when compared with the French practice. The experience of our lumbermen in French managed forests should make a difference in their attitude on their return to Canada.

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The Alberta Inspection District deserves a great deal of credit for the excellent news letter they are sending to the men from the District who have gone to the front and it would be a splendid idea if they could afford to send it to all foresters on the other side.

A meeting of the Forest Protection Committee for the Province of British Columbia, was held recently in Victoria. This committee consists of two prominent lumbermen representing the Lumbermen's and Loggers' Association and three members of the Forestry Branch of the Government. The fire protection fund began with

a balance for the past year of \$5000. The receipts were \$228,000, and the expenditures about \$215,000. The expenditure was divided into, patrol \$101,523, fire fighting \$90,523 and improvements, in which item are included 13 motor cars, \$14,513. There were 205 patrolmen for the season, which was a very bad one. The use of automobiles proved an unqualified success in increasing the efficiency of both patrol and fire fighting, and also cut down the patrol expense as the men could cover so much more ground.

It was planned to use many short time men during the danger season, but the scarcity of labor made this difficult. However, the season was successful when it is considered that conditions were almost the worst on record. The experience of the past season shows that local arrangements for securing men, tools and food need improvement. Localities should be provided for lists of men available for fighting fires, there should be more tool caches at strategic points and food lists for gangs of different sizes should be prepared and supplied to district foresters and country stores so that in emergencies, the men in charge of the work can concentrate on putting out the fires and not be so hampered with details of securing tools and provisions.

In the fall slash burning operations were carried out to a considerable extent in the Cranbrook, Nelson and Vancouver Island Districts in some cases by the operators on their own initiative, in other cases in conjunction with the Forest Service. Further burning is planned for the spring, particularly in the Kamloops District. Each year there is an improvement in the cooperation of the public with the fire prevention work and the permit system seems to be carried out more efficiently and with less friction. Last season some 4,100 permits covering 21,500 acres were issued. As a rule they were for short periods, seldom exceeding fourteen days. During dangerous periods in the southern districts all permits were cancelled for periods varying from two weeks to two months; 986 fires were reported, of which about one-third entailed extra labor in extinguishing. The total area burned over was one-quarter million acres. Only about one-eighth of this contained merchantable timber and the net stumpage loss is valued at slightly over \$100,000. Buildings, logging equipment and logs destroyed gave a further loss of \$160,000. This record is much better than that for the previous serious season of 1914. Eleven prosecutions were brought and convictions obtained in eight cases, with fines ranging from \$25 to \$1,150. Twenty-four light automobiles were used and made 61,587 miles at a cost of approximately 5½ cents per mile.

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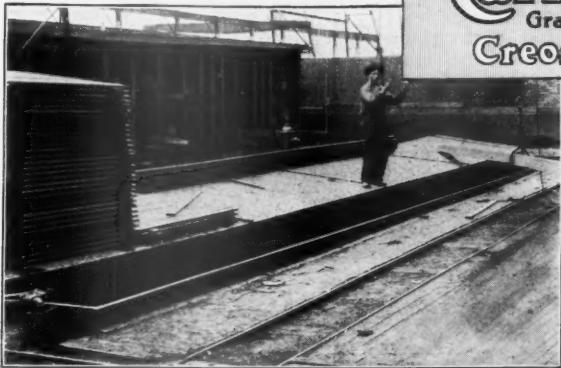
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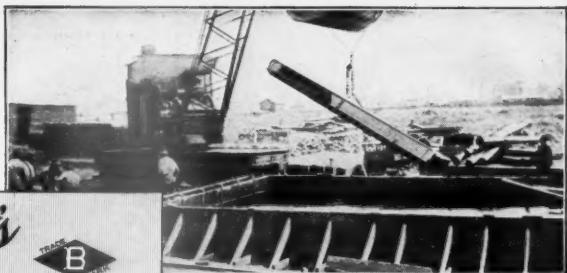


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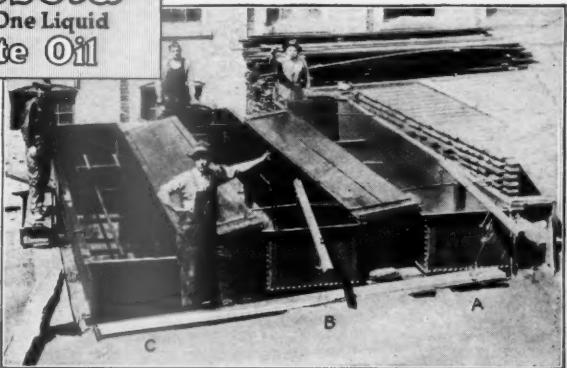


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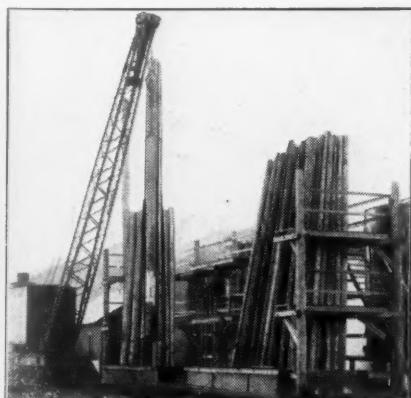
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